NFPA® 101®

Life Safety Code®

Code | 2024

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2024 Edition

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NFPA 101®

Life Safety Code®

2024 Edition

This edition of NFPA *101*®, *Life Safety Code*®, was prepared by the Technical Committees on Assembly Occupancies; Board and Care Facilities; Building Service and Fire Protection Equipment; Detention and Correctional Occupancies; Educational and Day-Care Occupancies; Fire Protection Features; Fundamentals of Safety to Life; Health Care Occupancies; Industrial, Storage, and Miscellaneous Occupancies; Interior Finish and Contents; Means of Egress; Mercantile and Business Occupancies; and Residential Occupancies; released by the Correlating Committee on Safety to Life and acted on by the NFPA membership during the 2023 NFPA Technical Meeting held June 22. It was issued by the Standards Council on August 25, 2023, with an effective date of September 14, 2023, and supersedes all previous editions.

This edition of NFPA *101* was approved as an American National Standard on September 14, 2023.

Origin and Development of NFPA *101*

The *Life Safety Code* had its origin in the work of the Committee on Safety to Life of the National Fire Protection Association, which was appointed in 1913. In 1912, a pamphlet titled *Exit Drills in Factories, Schools, Department Stores and Theaters* was published following its presentation by the late Committee member R. H. Newbern at the 1911 Annual Meeting of the Association. Although the pamphlet's publication antedated the organization of the committee, it was considered a committee publication.

For the first few years of its existence, the Committee on Safety to Life devoted its attention to a study of the notable fires involving loss of life and to analyzing the causes of this loss of life. This work led to the preparation of standards for the construction of stairways, fire escapes, and other egress routes for fire drills in various occupancies, and for the construction and arrangement of exit facilities for factories, schools, and other occupancies. These reports were adopted by the National Fire Protection Association and published in pamphlet form as *Outside Stairs for Fire Exits* (1916) and *Safeguarding Factory Workers from Fire* (1918). These pamphlets served as a groundwork for the present *Code*. These pamphlets were widely circulated and put into general use.

In 1921, the Committee on Safety to Life was enlarged to include representatives of certain interested groups not previously participating in the standard's development. The committee then began to further develop and integrate previous committee publications to provide a comprehensive guide to exits and related features of life safety from fire in all classes of occupancy. Known as the *Building Exits Code*, various drafts were published, circulated, and discussed over a period of years, and the first edition of the Building Exits Code was published by the National Fire Protection Association in 1927. Thereafter, the committee continued its deliberations, adding new material on features not originally covered and revising various details in the light of fire experience and practical experience in the use of the *Code*. New editions were published in 1929, 1934, 1936, 1938, 1939, 1942, and 1946 to incorporate the amendments adopted by the National Fire Protection Association.

National attention was focused on the importance of adequate exits and related fire safety features after the Cocoanut Grove Nightclub fire in Boston in 1942 in which 492 lives were lost. Public attention to exit matters was further stimulated by the series of hotel fires in 1946 (LaSalle, Chicago — 61 dead; Canfield, Dubuque — 19 dead; and Winecoff, Atlanta — 119 dead). The *Building Exits Code*, thereafter, was used to an increasing extent for regulatory purposes. However, the *Code* was not written in language suitable for adoption into law, because it had been drafted as a reference document and contained advisory provisions that were useful to building designers but inappropriate for legal use. This led to a decision by the committee to re-edit the entire *Code*, limiting the body of the text to requirements suitable for mandatory application and placing advisory and explanatory material in notes. The re-editing expanded *Code* provisions to cover additional

occupancies and building features to produce a complete document. The *Code* expansion was carried on concurrently with development of the 1948, 1949, 1951, and 1952 editions. The results were incorporated into the 1956 edition and further refined in subsequent editions dated 1957, 1958, 1959, 1960, 1961, and 1963.

In 1955, NFPA 101B, on nursing homes, and NFPA 101C, on interior finish, were published. NFPA 101C was revised in 1956. These publications have since been withdrawn.

In 1963, the Committee on Safety to Life was restructured to represent all interested factions and to include only those members with broad knowledge of fire matters. The committee served as a review and correlating committee for seven sectional committees whose personnel included members having a special knowledge and interest in various portions of the *Code*.

Under the revised structure, the sectional committees, through the Committee on Safety to Life, prepared the 1966 edition of the *Code*, which was a complete revision of the 1963 edition. The *Code* title was changed from *Building Exits Code to Code for Safety to Life from Fire in Buildings and Structures*. The *Code* text was written in enforceable code language, and all explanatory notes were placed in an appendix.

The *Code* was placed on a 3-year revision schedule, with new editions adopted in 1967, 1970, 1973, and 1976.

In 1977, the Committee on Safety to Life was reorganized as a technical committee, with an executive committee and standing subcommittees responsible for various chapters and sections. The 1981 edition contained major editorial changes, including reorganization within the occupancy chapters, to make them parallel to each other, and the splitting of requirements for new and existing buildings into separate chapters. Chapters on detention and correctional facilities were added, as well as new sections for ambulatory health care centers.

The 1985 edition contained a new Chapter 21 on residential board and care occupancies with related Appendix F and Appendix G, a new Appendix D on alternative calculations for stair width, and Appendix E, a fire safety evaluation system (FSES) for detention and correctional facilities.

The 1988 edition contained a major change in the method of determining egress capacity with the deletion of the traditional units of exit width and the substitution of a straight linear approach to calculating egress capacity. Appendix C through Appendix G were moved from NFPA *101* into a new document, NFPA 101M.

The 1991 edition contained numerous new requirements for mandatory sprinklers in new health care facilities, hotels, apartment buildings, lodging and room houses, and board and care facilities, as well as mandatory sprinkler requirements for existing high-rise hotels and apartment buildings. The requirements for board and care facilities were split into two chapters, Chapter 22 for new construction and Chapter 23 for existing buildings.

The 1994 edition contained new requirements for accessible means of egress, areas of refuge, and ramps, putting the *Code* in substantial agreement with the Americans with Disabilities Act Accessibility Guidelines (ADAAG).

The 1997 edition relocated the material on day care occupancies from Chapters 10 and 11 for new and existing educational occupancies to new Chapters 30 and 31. The operating features requirements, previously contained in Chapter 31, were interspersed throughout the *Code*, as applicable.

The 2000 edition introduced a performance-based option via Section 4.4 and new Chapter 5. That edition also reformatted the *Code* for substantial compliance with the NFPA *Manual of Style*: (1) former Chapter 1, General, was split into Chapter 1, Administration, and Chapter 4, General; (2) the mandatory references list was moved from Chapter 33 to Chapter 2; (3) all definitions were moved into Chapter 3, and each defined term was numbered; (4) the paragraph numbering style that separated the chapter number from the section number using a hyphen was changed to the use of a decimal point as the separator; and (5) the appendixes were renamed annexes. Former Chapter 32 on special structures and high-rise buildings was moved to Chapter 11 to join the core chapters (i.e., the chapters that are not occupancy specific). The subject of interior finish, contents, and furnishings was moved from Section 6.5 into a separate new chapter, Chapter 10. The occupancy chapters, formerly Chapters 8 through 32, became Chapters 12 through 42, with some repositioning of chapters. For example, the daycare occupancies chapters were renumbered from Chapters 30/31 to Chapters 16/17, so as to be positioned immediately after the chapters for educational occupancies.

The 2003 edition reformatted all exceptions into numbered or lettered paragraphs. Some reformatting of paragraphs with multiple requirements was done for additional compliance with the NFPA *Manual of Style*.

The 2006 edition repositioned the inch-pound (US Customary) units to appear first, followed by the metric equivalent (SI) units in parentheses. New Chapter 43, Building Rehabilitation, was added to promote the adaptive reuse of existing buildings without sacrificing needed life safety.

The 2009 edition added provisions to Chapter 7 for electrically controlled egress doors, horizontal-sliding doors serving an area with an occupant load of fewer than 10, elevator lobby access door locking, and door inspection and maintenance. The remoteness criteria of Chapter 7 were expanded to have applicability to all three portions of the means of egress — exit access, exit, and exit discharge. Extensive revisions were made throughout the *Code* to standardize the use of the terms *stories in height,*

finished ground level, grade plane, basement, and level of exit discharge. Section 9.6 and the applicable occupancy chapters were revised to limit the use of public address systems for occupant alarm notification to large venue assembly occupancies and mercantile mall buildings, where the physical configuration, function, and human behavior present challenges with respect to effective occupant notification by standard means in accordance with *NFPA 72*®, *National Fire Alarm Code*®. A subsection was added to Chapter 11 for special provisions applicable to air traffic control towers. The criteria for assembly stage proscenium opening fire curtains were deleted from Chapter 12 and replaced by a reference to the new fire curtain provisions of NFPA 80, *Standard for Fire Doors and Other Opening Protectives.* Provisions were added to Chapters 14 through 17 for the placement and use of alcohol-based hand-rub dispensers in educational and day-care occupancies. The provisions of Chapters 18 and 19 were expanded to address door locking where the needs of patients or clients require specialized protective measures for their safety and security in hospitals, nursing homes, and limited care facilities. Also, a limitation on common path of travel was added to Chapter 18 for new health care occupancies; the requirement for patient sleeping room windows was deleted for new and existing health care occupancies; and all existing high-rise health care occupancy buildings must be sprinklered within 12 years of the adoption of this edition of the *Code.* Numerous occupancy chapters were revised to require emergency plans in accordance with Section 4.8. Chapter 43 on building rehabilitation was revised to address issues not identified when the chapter was written for the 2003 edition and to delete redundancies. An adoptable annex was added for elevators for occupant evacuation prior to Phase I Emergency Recall Operations. Another adoptable annex was added for supplemental escape devices and systems.

The 2012 edition expanded what had been the definitions of *noncombustible material* and *limited-combustible material* and moved the material to new subsections in Chapter 4. The material addressing elevators for occupant controlled evacuation, which had comprised Annex B, was moved to Chapter 7. A new section was added to Chapter 7 to address normally unoccupied building service equipment support areas. The Chapter 8 table addressing minimum fire protection ratings for opening protectives was expanded. Provisions for carbon monoxide detection were added to Chapter 9. Requirements for carbon monoxide detection were added to some of the occupancy chapters. The health care occupancies provisions were modified to permit the health care setting to be made more homelike.

The 2015 edition included new provisions in Chapter 4 detailing the code requirements hierarchy to be applied where a provision in one chapter conflicts with a provision in another chapter. Means of egress provisions were revised or added relative to rooms opening directly onto an exit enclosure, door opening threshold height for spaces not normally occupied, door encroachment on egress width, existing door frames without labels, security access turnstiles, handrail orientation on flaring-width stairs, horizontal exit stacking, horizontal exit exterior wall extensions, elevators in towers, occupant evacuation elevators, and occupant load factors for ambulatory health care and concentrated business use. Atrium walls are permitted to serve as part of the separation for creating separated occupancies on a story-by-story basis. The provisions for the inspection of door assemblies were revised so that fire-rated doors are addressed in Chapter 8 and non-rated egress doors in Chapter 7. The Chapter 8 table addressing minimum fire protection rating for opening protectives was again expanded. Provisions for alcohol-based hand-rub dispensers were added to Chapter 8 so they can be referenced by the occupancy chapters. The high-rise building provisions of Chapter 11 were expanded to include remote video monitoring of exit stair enclosures. The assembly occupancy life safety evaluation provisions were expanded. The day care and residential board and care occupancy provisions were revised to permit more than one floor level to be considered the level of exit discharge. The health care occupancy provisions were further revised to permit facilities to be made more home-like, including a reduction in nursing home minimum corridor width and the clarification of permitted smoke alarm placement for kitchens that are open to the corridor. Health care occupancy doors subject to locking are permitted to be disguised with murals. Smoke barriers are permitted to be omitted on a non–health care floor below a health care floor. The ambulatory health care occupancy chapters were rewritten to be self-contained, removing the need to reference the business occupancy chapters.

The 2018 edition expanded the *Code's* scope to include hazardous materials emergencies, injuries from falls, and emergency communications. In Chapter 4, a reference was added to NFPA 241 for construction, alteration, and demolition operations, and new requirements for fire-retardant-treated wood. In Chapter 7, the terms *electrically controlled egress door assemblies, delayed-egress locking systems,* and *access-controlled egress door assemblies* were revised to *door hardware release of electrically locked egress door assemblies, delayed-egress electrical locking systems,* and *sensor-release of electrical locking systems,* respectively. New Chapter 7 criteria was added that permits occupant load to be reduced to available egress capacity as was previously permitted only for building rehabilitation. In Chapter 8, wall marking and identification provisions for fire barriers, smoke barriers, and smoke partitions were added. Opening protective requirements were substantially revised and reorganized. A reference to NFPA 4 was added to Chapter 9 for integrated fire protection and life safety system testing and new provisions for risk analyses for mass notification systems. In Chapter 10, the interior finish requirements for expanded vinyl wall coverings and textile wall and ceiling coverings were revised, and new provisions for laminated products and facings or wood veneers were added. In Chapter 11, the provisions for airport traffic control towers were revised, and the emergency lighting and standby power requirements for high-rise buildings were reorganized. Animal housing facilities were added as special structures. Carbon-monoxide detection requirements for new assembly occupancies were added to Chapter 12. In Chapters 14–17, 38, and 39, criteria for door locking to prevent unwanted entry in educational, day-care, and business occupancies were added. The sprinkler requirement threshold for new educational occupancies in Chapter 14 was revised. Health care corridor projection allowances in Chapters 18 and 19 were modified to correlate with accessibility standards and to permit the installation of emergency stair travel devices and self-retracting seats. New provisions were added to permit health care and ambulatory health care smoke compartments up to 40,000 ft^2 (3720 m^2) in area. In Chapters 20 and 21, door locking provisions for patient special needs in ambulatory

health care occupancies were revised. In Chapter 24, criteria for bathtub and shower grab bars were added and then referenced by numerous occupancy chapters. Attic protection requirements were added to Chapters 28 and 30 for certain new hotels and dormitories and apartment buildings. In Chapter 32, carbon-monoxide detection requirements for new residential board and care occupancies were added. Mall terminology was revised in Chapters 36 and 37, and new provisions were added to differentiate between open and enclosed mall concourses. In Chapters 38 and 39, a reference to NFPA 99 for medical gases in business occupancies was added. A new Annex C was added to provide guidance on several NFPA hazardous materials standards.

The 2021 edition included allowance for a second door lock/latch releasing motion on existing educational and day care occupancy classroom doors to accommodate lockdown events; mandatory sprinklers in new day care occupancies with more than 12 clients; modified sprinkler requirements for existing high-rise buildings containing ambulatory health care, business, industrial, or apartment building occupancies; modified construction limits for existing nursing homes; clarification that non-required fire doors are not subject to the inspection requirements of NFPA 80; requirements for temporary barriers to separate areas under construction in health care and ambulatory health care occupancies; updated criteria for special amusement buildings; mandatory sprinkler requirement for new bars and restaurants with an occupant load of 50 or more; minimum requirements for fire department two-way communication signal strength in all new buildings; carbon monoxide detection requirements for existing hotels and dormitories; low-frequency fire alarm notification signal requirements in new hotel, dormitory, and apartment building sleeping rooms in accordance with *NFPA 72*; and requirements for burglar bars/grates on means of escape windows in residential occupancies.

Key revisions in the 2024 edition include updated emergency action plan requirements to address security features; allowance for other exits associated with horizontal exits to discharge through the building where sprinklered; revised listing and installation requirements for two-way communications systems in areas of refuge; allowance for additional exit discharge through interior building areas; updated alcohol-based hand-rub solution dispenser and storage requirements; new requirements for inflatable amusement devices, modular rooms, and sleep pods; smokeproof enclosure exemption for sprinklered high-rise buildings; additional carbon monoxide detection requirements for existing educational, new and existing day-care, new health care, new ambulatory health care, new and existing detention and correctional, existing one- and two-family dwelling, existing lodging or rooming house, and existing apartment building occupancies; new requirements for and guidance on alternate care sites (ACSs); revised door locking and suite supervision requirements for health care occupancies; new requirements for apartment building occupancy valet trash collection services; and mandatory automatic sprinkler system requirements for all new parking structures.

The following comments are offered to assist in the use of the *Life Safety Code*. Additional help on using the *Life Safety Code* can be obtained by attending one of the seminars NFPA conducts on the *Life Safety Code* or by using the *Life Safety Code Handbook* available from NFPA. Further information on these seminars is available through the NFPA Division of Continuing Education.

Essentially, the *Code* comprises four major parts. The first part consists of Chapters 1 through 4, Chapters 6 through 11, and Chapter 43; these are often referred to as the base chapters or fundamental chapters. The second part is Chapter 5, which details the performance-based option. The next part consists of Chapters 12 through 42, which are the occupancy chapters. The fourth and last part consists of Annex A through Annex D, which contain useful additional information.

A thorough understanding of Chapters 1 through 4, Chapters 6 through 11, and Chapter 43 is necessary to use the *Code* effectively, because these chapters provide the building blocks on which the requirements of the occupancy chapters are based. Note that many of the provisions of Chapters 1 through 4 and Chapters 6 through 11 are mandatory for all occupancies. Some provisions are mandated only when referenced by a specific occupancy, while others are exempted for specific occupancies. Often, in one of the base chapters, especially in Chapter 7, the phrase “where permitted by Chapters 11 through 43” appears. In this case, that provision can be used only where specifically permitted by an occupancy chapter. For example, the provisions of 7.2.1.6.1 on delayed-egress electrical locking systems are permitted only when permitted by Chapters 11 through 43. Permission to use delayed-egress electrical locking systems is normally found in the “____.2.2” subsection of each occupancy chapter. For example, 12.2.2.2.5 specifically permits the use of delayed-egress electrical locking systems in new assembly occupancies. If this permission is not found in an occupancy chapter, delayed-egress electrical locking systems cannot be used. Similar types of restricted permission are found for such items as security grilles, double-cylinder locks, revolving doors, and so forth. In other locations in the base chapters, the wording “unless prohibited by Chapters 11 through 43” is used. In this case, the provision is permitted in all occupancies, unless specifically prohibited by an occupancy chapter.

Metric units of measurement in this *Code* are in accordance with the modernized metric system known as the International System of Units (SI). The unit liter, which is outside of but recognized by SI, is commonly used and is therefore used in this *Code*. In this *Code*, inch-pound units for measurements are followed by an equivalent in SI units, as noted in 1.5.2. The inch-pound value and the SI value are each acceptable for use as primary units for satisfying the requirements of this *Code*.

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NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

Committee Scope: This Committee shall have primary responsibility for documents on the protection of human life from fire and other circumstances capable of producing similar consequences and for the nonemergency and emergency movement of people.

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Karl G. Ruling, Entertainment Services & Technology Association, NY [U]
Rep. US Institute for Theatre Technology, Inc.
Charles J. Schweitzer, City of Lincoln, NE [E]
Philip R. Sherman, Philip R. Sherman, PE, NH [SE]
Jeffrey Shirey, University of Maryland - Office of the Fire Marshal, MD [E]
Stephen Patrick Stiller, Siemens, IL [M]
Rep. National Electrical Manufacturers Association
Elbert R. Thomas, Jr., New Orleans Fire Department, LA [E]
Jeffrey S. Tubbs, Arup, MA [SE]

Alternates

John August Denhardt, American Fire Sprinkler Association (AFSA), TX [IM]
(Alt. to Kevin Ryan Hall)
Brad Everett, Louisiana State Fire Marshal, LA [E]
(Alt. to Elbert R. Thomas, Jr.)
Jerrold S. Gorrell, Theatre Safety Programs, AZ [U]
(Alt. to Karl G. Ruling)
Shawn M. Hanson, Greater Naples Fire Rescue District, FL [E]
(Alt. to Eric Center)
David Kurasz, New Jersey Fire Sprinkler Advisory Board, NJ [M]
(Alt. to Ryan Lee Peterson)
Christopher Prueher, Code Consultants, Inc., CA [U]
(Alt. to Kevin D. Morin)
Ryan Sandler, ADT Commercial LLC./Red Hawk Fire Security, CA [M]
(Alt. to Michael Connor)
Megan Talbott, City of Lincoln, NE [E]
(Alt. to Charles J. Schweitzer)
Janet A. Washburn, Bonita Springs Fire Control District, FL [E]
(Alt. to Stephen C Hesson)
Toby J. White, Arup, MA [SE]
(Alt. to Jeffrey S. Tubbs)

Gregory E. Harrington, NFPA Staff Liaison

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Committee Scope: This Committee shall have primary responsibility for documents on protection of human life and property from fire and other circumstances capable of producing similar consequences, and on the nonemergency and emergency movement of people in assembly occupancies, tents, and membrane structures.

Technical Committee on Board and Care Facilities

John A. Rickard, *Chair*
P3 Consulting, TX [SE]

Camille Levy, *Secretary*
National Fire Protection Association (NFPA), MA

Eddie Dewayne Alday, Agency for Health Care Administration, FL [E]

Roland A. Asp, National Fire Sprinkler Association, Inc., MD [M]

Chad E. Beebe, ASHE - AHA, WA [U]

Tracey D. Bellamy, Telgian Corporation, GA [SE]

Harry L. Bradley, Maryland State Fire Marshal's Office, MD [E]
Rep. International Fire Marshals Association

Richard L. Day, Michigan State Fire Marshal's Office, MI [E]

Martin J. Farraher, Siemens Industry, Inc., IL [M]
Rep. National Electrical Manufacturers Association

Nicholas E. Gabriele, JENSEN HUGHES, CT [SE]

Anne M. Guglielmo, Code Consultants, Inc., MO [SE]

Steven Heaney, Brandywine Senior Living, NJ [U]
Rep. American Health Care Association

Peter A. Larrimer, US Department of Veterans Affairs, PA [U]

Mark Larson, Mark Larson and Associates LLC, ID [U]
Rep. National Disability Rights Network

Randy S. McDermott, US Department of Health & Human Services, TX [E]

David E. Mills, UL LLC, IL [RT]

Brian J. Pinkowski, Pinkowski Law & Policy Group, CO [U]
Rep. Residential Assisted Living National Association (RALNA)

Carter J. Rierson, Best Defense Fire Protection, WI [IM]

Heather Roth, New York State Office of Fire Prevention and Control, NY [E]

Ryan Sandler, ADT Commercial LLC./Red Hawk Fire Security, CA [M]
Rep. Automatic Fire Alarm Association, Inc.

Dennis L. Schmitt, Illinois Department of Public Health (IDPH), IL [E]

Joshua Swann, Exponent, Inc., MD [SE]

Joshua Talley, Koffel Associates, Inc., MD [SE]

Jon Taluba, Greenwood Sales, NH [M]

Alternates

Kerry M. Bell, UL LLC, IL [RT]
(Alt. to David E. Mills)

Robert J. Dobberstein, JENSEN HUGHES, NY [SE]
(Alt. to Nicholas E. Gabriele)

Kurtis Grant, US Department of Health & Human Services, GA [E]
(Alt. to Randy S. McDermott)

Kevin Knippa, Texas Health and Human Services Commission, TX [E]
(Voting Alt.)

James K. Lathrop, Koffel Associates, Inc., CT [SE]
(Alt. to Joshua Talley)

Kaitlin McGillvray, Code Consultants, Inc., NY [SE]
(Alt. to Anne M. Guglielmo)

Pamela Reno, Telgian, OH [SE]
(Alt. to Tracey D. Bellamy)

Jeffery G. Van Keuren, Edwards/Carrier, FL [M]
(Alt. to Ryan Sandler)

Terry L. Victor, Johnson Controls, MD [M]
(Alt. to Roland A. Asp)

Fred Worley, Fred Worley Architect, TX [SE]
(Alt. to John A. Rickard)

Camille Levy, NFPA Staff Liaison

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Committee Scope: This Committee shall have primary responsibility for documents on protection of human life and property from fire and other circumstances capable of producing similar consequences, and on the emergency movement of people in residential board and care facilities.

Technical Committee on Building Service and Fire Protection Equipment

Raymond A. Grill, *Chair*
Ray Grill Consulting PLLC, VA [SE]

Stephen Ganoe, *Secretary*
National Fire Protection Association, MA

Jodi S. Balido, Mason & Hanger, VA [SE]

Harry L. Bradley, Maryland State Fire Marshal's Office, MD [E]
Rep. International Fire Marshals Association

Kevin L. Brinkman, National Elevator Industry, Inc., IL [M]
Rep. National Elevator Industry Inc.

Flora F. Chen, Hayward Fire Department, California, CA [E]

Stephen E. Dale, Cincinnati Insurance Company, OH [I]

Paul M. Donga, Boston Fire Department, MA [E]

Kevin Ryan Hall, American Fire Sprinkler Association (AFSA), MD [IM]

Bryan Lawrence Hoskins, Oklahoma State University, OK [SE]

Jeffrey M. Hugo, National Fire Sprinkler Association, Inc., MI [M]

Joseph M. Jardin, Fire Department City of New York (FDNY), NY [C]
Rep. NFPA Fire Service Section

Michael Kellett, State of Connecticut, CT [E]
Rep. Connecticut State Fire Marshal/Connecticut Fire Marshals Association

Richard L. Klinker, Klinker & Associates, Inc., MD [SE]

Peter A. Larrimer, US Department of Veterans Affairs, PA [U]

Mark Larson, Mark Larson and Associates LLC, ID [U]
Rep. National Disability Rights Network

Jeffrey Lascar, Comcast, NY [IM]
Rep. Electronic Security Association

Daniel J. Lazarz, EYP Architecture & Engineering, MA [SE]

Scott E. Panowitz, BFPE International, MD [M]
Rep. Fire Suppression Systems Association

David Pursel, Berkshire Systems Group Inc., PA [IM]

Rodger Reiswig, Johnson Controls, VA [M]

Pamela Reno, Telgian, OH [M]
Rep. Automatic Fire Alarm Association, Inc.

Richard Jay Roberts, Honeywell Fire Safety, IL [M]
Rep. National Electrical Manufacturers Association

Kurt A. Ruchala, JENSEN HUGHES, MA [SE]

Mark Ryan Smith, Summit Fire & Security/Fire & Life Safety America, VA [IM]

Michael R. Szmanda, Certification & Training Corporation, MN [IM]

Jeffrey J. Van Rhyn, Jr., Local 669 JATC, NV [L]
Rep. United Assn. of Journeymen & Apprentices of the Plumbing & Pipe Fitting Industry

Todd W. Warner, Brooks Equipment Company, Inc., MT [M]
Rep. Fire Equipment Manufacturers' Association

David M. Wyatt, Pacific Northwest National Laboratory-Battelle, WA [U]

Alternates

Jack P. Coffelt, Asurio, CO [M]
(Alt. to Jeffrey M. Hugo)

Kelly Finzel, Arup, NY [SE]
(Alt. to Raymond A. Grill)

Greg Gottlieb, Hauppauge Fire District, NY [C]
(Alt. to Joseph M. Jardin)

Claudia Hagood, Klinker and Associates, Inc., MD [E]
(Alt. to Richard L. Klinker)

Kevin P. Holbrook, Local 669 JATC, OH [L]
(Alt. to Jeffrey J. Van Rhyn, Jr.)

John Houlihan, Fire Command Systems, Inc., MA [M]
(Alt. to Pamela Reno)

Ignatius Kapalczynski, Simsbury Fire District, CT [E]
(Alt. to Michael Kellett)

Roy C. Kimball, Brooks Equipment Company, LLC., NC [M]
(Alt. to Todd W. Warner)

Peter Leszczak, US Department of Veterans Affairs, CT [U]
(Alt. to Peter A. Larrimer)

Maria B. Marks, Siemens Industry, Inc., MD [M]
(Alt. to Richard Jay Roberts)

Joshua P. McDonald, American Fire Sprinkler Association (AFSA), TX [IM]
(Alt. to Kevin Ryan Hall)

Marc Mueller, TK Elevator Americas/Thyssenkrupp Elevator, TN [M]
(Alt. to Kevin L. Brinkman)

Terry L. Victor, Johnson Controls, MD [M]
(Alt. to Rodger Reiswig)

Joseph J. Watson, JENSEN HUGHES, RI [SE]
(Alt. to Kurt A. Ruchala)

Justin Yates, Cincinnati Insurance Company, AR [I]
(Alt. to Stephen E. Dale)

Stephen Ganoe, NFPA Staff Liaison

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Committee Scope: This Committee shall have primary responsibility for documents on the application of fire protection systems including detection, alarm, and suppression, and the life safety impact of various building systems.

Technical Committee on Detention and Correctional Occupancies

Janna E. Serafim, *Chair*
Code Red Consultants, LLC, MA [SE]

Jen Sisco, *Secretary*
National Fire Protection Association, MA

Clay P. Aler, Koffel Associates, Inc., MD [SE]
David W. Ash, US Department. of Justice, KY [U]
Tracy Bollig, American Fire Sprinkler Corporation, KS [M]
Rep. National Fire Sprinkler Association
Christopher Currenti, NY City Department Of Correction, NY [E]
Derek R. Duval, Coffman Engineers, CA [SE]
Randy Gaw, DET-CORR Fire Safety Consulting, Canada [SE]
Nolan T. Griffiths, Massachusetts Department of Correction (MA DOC), MA [U]
Rick Heffernan, SDi, NJ [M]
Rep. National Electrical Manufacturers Association
Michael Kruszelnicki, Correctional Service of Canada, Canada [E]
Mark Larson, Mark Larson and Associates LLC, ID [U]
Rep. National Disability Rights Network
Troy A. Lumley, South McCreary Fire & Rescue, KY [E]
Joseph McNulty, Baltimore City Fire Department, MD [U]
Jack Poole, Poole Fire Protection, Inc., KS [SE]
Robert Paul Ricketts, Foothill Fire Protection, Inc., CA [IM]
Terry Schultz, Code Consultants, Inc., MO [SE]
Roslyn Shender, W Lewis Frame Door Inc., PA [M]
Rep. Door and Hardware Institute
Sichel Young, Monterey City Fire Department, CA [E]
Garrick Youngberg, Performance Systems, OR [M]
Rep. Automatic Fire Alarm Association, Inc.

Alternates

Kina Campbell, Koffel Associates, MD [SE]
(Alt. to Clay P. Aler)
James Lewis, American Fire Sprinkler Corporation, KS [M]
(Alt. to Tracy Bollig)
John H. Marchette, Performance Systems, OR [M]
(Alt. to Garrick Youngberg)
Andrew W. Poole, Poole Fire Protection, Inc., KS [SE]
(Alt. to Jack Poole)
Rodger Reiswig, Johnson Controls, VA [M]
(Alt. to Rick Heffernan)
Robert W. Travers, Massachusetts Department of Correction (MA DOC), MA [U]
(Alt. to Nolan T. Griffiths)

Nonvoting

Reginald D. Jackson, US Department of Labor, DC [E]

Jen Sisco, NFPA Staff Liaison

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Committee Scope: This Committee shall have primary responsibility for documents on protection of human life and property from fire and other circumstances capable of producing similar consequences, and on the emergency movement of people in detention and correctional occupancies.

Technical Committee on Educational and Day-Care Occupancies

Matthew J. Mertens, *Chair*
North Shore Fire Department, WI [E]
Rep. International Fire Marshals Association

Camille Levy, *Secretary*
National Fire Protection Association (NFPA), MA

Mark J. Aaby, WSP USA, SC [SE]
Clay P. Aler, Koffel Associates, Inc., MD [SE]
Mohammed Alsulaiti, State of Qatar Ministry of Interior-Qatar Civil Defense, Qatar [E]
Dorn J Beddow, Lee County School District (LCSD), FL [U]
Scott J. Blaser, Florida School Boards Association, FL [U]
Samuel S. Dannaway, Coffman Engineers, HI [SE]
Richard L. Day, Michigan State Fire Marshal's Office, MI [E]
Richard M. DiMisa, Code Consultants, Inc., MO [SE]
Jason D. Ellis, University of Kentucky, KY [U]
Keith S. Frangiamore, Fire Safety Consultants, Inc., IL [SE]
Laura Frye, Door Safety LLC, VA [SE]
Jeffrey L. Haidacher, Fairfax County Public Schools, VA [U]
Raymond N. Hansen, US Department of the Air Force, FL [U]
Howard Hopper, UL LLC, CA [RT]
Terrence J. Julka, J. F. Ahern Company, WI [M]
Rep. National Fire Sprinkler Association
Maria B. Marks, Siemens Industry, Inc., MD [M]
Rep. National Electrical Manufacturers Association
Richard E. Merck, Montgomery County Fire & Rescue Service, MD [E]
Michael Naber, JENSEN HUGHES, CO [M]
Rep. Automatic Fire Alarm Association, Inc.
Guillermo Antonio Oviedo Vela, The Church of Jesus Christ of Latter-Day Saints, UT [U]
Mitchell Ramseur, M. Ramseur & Associates, PLLC., GA [SE]
Kurt A. Roeper, ASSA ABLOY, CT [M]
Rep. Steel Door Institute
Michael L. Savage, Sr., Marion County Building Safety, FL [E]
Catherine L. Stashak, Office of the Illinois State Fire Marshal, IL [E]
Rep. Office of the Illinois State Fire Marshal
Aleksy L. Szachnowicz, Anne Arundel County Public Schools, MD [U]
Patrick Szejna, Allegion PLC, WI [M]
Rep. Door and Hardware Institute

Alternates

Zainul Abedeen, WSP Middle East, United Arab Emirates [SE]
(Alt. to Mark J. Aaby)
Kina Campbell, Koffel Associates, MD [SE]
(Alt. to Clay P. Aler)
Andrew S. Carmean, US Department of the Air Force, FL [U]
(Alt. to Raymond N. Hansen)
Brandon Ernest, University of Kentucky, KY [U]
(Alt. to Jason D. Ellis)
Larry D. Rietz, JENSEN HUGHES, CO [M]
(Alt. to Michael Naber)
Richard Jay Roberts, Honeywell Fire Safety, IL [M]
(Alt. to Maria B. Marks)
Karl Wiegand, Victaulic/Globe Fire Sprinkler Corporation, MI [M]
(Alt. to Terrence J. Julka)

Camille Levy, NFPA Staff Liaison

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Committee Scope: This Committee shall have primary responsibility for documents on protection of human life and property from fire and other circumstances capable of producing similar consequences, and on the emergency movement of people in educational occupancies and day-care occupancies.

Technical Committee on Fire Protection Features

Nathan B. Wittasek, *Chair*
Simpson Gumpertz & Heger (SGH), CA [SE]

Jen Sisco, *Secretary*
National Fire Protection Association, MA

Zainul Abedeen, WSP Middle East, United Arab Emirates [SE]
Eddie Dewayne Alday, Agency for Health Care Administration, FL [E]
John M. Barrot, Banksia Engineering P.C., NY [SE]
Gregory J. Cahanin, Cahanin Fire & Code Consulting, FL [U]
Rep. Louisiana State Firemen's Association
David Cook, Ralph Gerdes Consultants, LLC, IN [SE]
Michael Scott Custer, Fort Detrick Fire Department, MD [E]
Nicholas A. Dawe, Cobb County Fire Marshal's Office, GA [E]
John F. Devlin, JENSEN HUGHES, MD [SE]
Jeffry T. Dudley, National Aeronautics & Space Administration, Kennedy Space Center (NASA), FL [U]
Edward S. Goldhammer, Hilti, CA [M]
Joseph Graupmann, Amentum/AECOM Technology, VA [SE]
Jack A. Gump, Consolidated Nuclear Security, TN [U]
Joseph Patrick Higgins, US Department of the Navy, FL [E]
Jeffrey M. Hugo, National Fire Sprinkler Association, Inc., MI [M]
Rep. National Fire Sprinkler Association
Jonathan Humble, American Iron and Steel Institute, CT [M]
Michael Ivanovich, AMCA International, IL [M]
Waymon Jackson, University of Texas at Austin, TX [U]
Ignatius Kapalczynski, Simsbury Fire District, CT [E]
Rep. Connecticut State Fire Marshal/Connecticut Fire Marshals Association
William E. Koffel, Koffel Associates, Inc., MD [M]
Rep. Glazing Industry Code Committee
William J. McHugh, Jr., Firestop Contractors International Association, IL [IM]
Rep. Firestop Contractors International Association
Jeramie W. Morris, Dow, Inc., MI [M]
Raymond C. O'Brocki, American Wood Council, DE [M]
Keith E. Pardoe, Pardoe Consulting LLC, VA [SE]
Shamim Rashid-Sumar, National Ready Mixed Concrete Assn., NY [M]
Rep. Portland Cement Association
Jeffrey E. Reetz, Fire and Risk Alliance, LLC, MD [SE]
Jon G. Roberts, UL LLC, OK [RT]
Kurt A. Roeper, ASSA ABLOY, CT [M]
Rep. Steel Door Institute
Eddie Sanchez, Miami Dade Fire Rescue, FL [E]
Catherine L. Stashak, Office of the Illinois State Fire Marshal, IL [E]
Rep. Office of the Illinois State Fire Marshal
Stephen Michael Tamburello, Telgian, GA [M]
Rep. Automatic Fire Alarm Association, Inc.
Alexander Frederick Zivnuska, Code Consultants, Inc., MO [SE]

Alternates

Paul Armstrong, PACCS, CA [M]
(Alt. to Raymond C. O'Brocki)
Erin N. Crowley, Code Consultants, Inc., MO [SE]
(Alt. to Alexander Frederick Zivnuska)
Timmy Dee, Consolidated Nuclear Security Y-12, LLC, TN [U]
(Alt. to Jack A. Gump)
Gayle Fratto, West Virginia University, WV [M]
(Alt. to Stephen Michael Tamburello)
Shane Hatmaker, Amentum/AECOM Technology, DC [SE]
(Alt. to Joseph Graupmann)
Howard Hopper, UL LLC, CA [RT]
(Alt. to Jon G. Roberts)
Josh Lambert, University of Texas at Austin, TX [U]
(Alt. to Waymon Jackson)
Chris Moran, JENSEN HUGHES, MD [SE]
(Alt. to John F. Devlin)
Lennon A. Peake, Koffel Associates, Inc., MD [M]
(Alt. to William E. Koffel)
Derek Bennett Post, Fire And Risk Alliance, LLC, IL [SE]
(Alt. to Jeffrey E. Reetz)
Ernesto Rodriguez, Jr., Wiginton Fire Protection Engineering, Inc., FL [M]
(Alt. to Jeffrey M. Hugo)

Nonvoting

Michael Earl Dillon, Dillon Consulting Engineers, Inc., CA [SE]
Rep. TC on Air Conditioning

Jen Sisco, NFPA Staff Liaison

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Committee Scope: This Committee shall have primary responsibility for documents on construction compartmentation, including the performance of assemblies, openings, and

penetrations, as related to the protection of life and property from fire and other circumstances capable of producing similar consequences.

Technical Committee on Fundamentals of Safety to Life

Chris Jelenewicz, *Chair*
Society of Fire Protection Engineers, MD [SE]

Gregory E. Harrington, *Secretary*
National Fire Protection Association, MA

Nasser Ahmed Al Zeyara, Qatar Civil Defense, Qatar [E]
Laura Bennett-Hourigan, Walt Disney World Parks & Resorts, FL [U]
Wayne G. Chip Carson, Carson Associates, Inc., VA [SE]
Amy Y. Cheng, Clark County Department of Development Services, NV [E]
Patrick B. Cotter, Sanford City Fire Department, ME [E]
Greg Davis, Louisiana Office Of State Fire Marshal, LA [E]
David W. Frable, US General Services Administration, IL [U]
Rep. US General Services Administration
Stanley C. Harbuck, School of Building Inspection, MA [C]
Rep. American Public Health Association
Lorraine Ann Horner, Dupont, DE [U]
Jeffrey M. Hugo, National Fire Sprinkler Association, Inc., MI [M]
Jonathan Humble, American Iron and Steel Institute, CT [M]
David J. Jacoby, Simpson Gumpertz & Heger, NY [SE]
David P. Klein, US Department of Veterans Affairs, DC [U]
Rep. US Department of Veterans Affairs
Scott T. Laramee, AON Property Risk, CA [I]
James K. Lathrop, Koffel Associates, Inc., CT [SE]
Ed Lisinski, American Wood Council (AWC), WI [M]
Todd D. Matteson, Parsons at SRS (SWPF), SC [U]
Ricardo Murga, US Department of Health & Human Services, MT [E]
Milosh T. Puchovsky, Worcester Polytechnic Institute, MA [SE]
Mitchell Ramseur, M. Ramseur & Associates, PLLC., GA [SE]
Rodger Reiswig, Johnson Controls, VA [M]
Rep. Automatic Fire Alarm Association, Inc.
Jon G. Roberts, UL LLC, OK [RT]
Michael Schmeida, Gypsum Association, OH [M]
Victoria B. Valentine, American Fire Sprinkler Association (AFSA), PA [IM]
Mike West, Siemens, OR [M]
Rep. National Electrical Manufacturers Association
Jeremy Zeedyk, National Energy Management Institute Committee (NEMIC), CT [IM]

Alternates

Jon-Paul Cardin, American Iron And Steel Institute, ID [M]
(Alt. to Jonathan Humble)
Timothy Earl, GBH International, MI [M]
(Alt. to Michael Schmeida)
Sharon S. Gilyeat, Koffel Associates, Inc., MD [SE]
(Alt. to James K. Lathrop)
Louis Guerrazzi, Society of Fire Protection Engineers (SFPE), MD [SE]
(Alt. to Chris Jelenewicz)
Kevin Ryan Hall, American Fire Sprinkler Association (AFSA), MD [IM]
(Alt. to Victoria B. Valentine)
Matthew M. Hunter, American Wood Council, PA [M]
(Alt. to Ed Lisinski)
Bruce E. Johnson, UL LLC, NY [RT]
(Alt. to Jon G. Roberts)
Maria B. Marks, Siemens Industry, Inc., MD [M]
(Alt. to Mike West)
James M. Mundy, Jr., Asset Protection Associates, Ltd., NY [M]
(Alt. to Rodger Reiswig)
Jake Pauls, Jake Pauls Consulting Services, Canada [C]
(Alt. to Stanley C. Harbuck)
John R. Swanson, National Fire Sprinkler Association (NFSA), MN [M]
(Alt. to Jeffrey M. Hugo)

Nonvoting

Pichaya Chantranuwat, Fusion Consultants Co. Ltd/Thailand, Thailand [SE]

Gregory E. Harrington, NFPA Staff Liaison

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Committee Scope: This Committee shall have primary responsibility for documents on the basic goals, objectives, performance requirements, and definitions for protection of human life and property from fire, earthquake, flood, wind, and other circumstances capable of producing similar consequences, on the nonemergency and emergency movement of people, and on high-rise buildings.

Technical Committee on Health Care Occupancies

William E. Koffel, *Chair*
Koffel Associates, Inc., MD [SE]

Gregory E. Harrington, *Secretary*
National Fire Protection Association, MA

Eddie Dewayne Alday, Agency for Health Care Administration, FL [E]

Chad E. Beebe, ASHE - AHA, WA [U]

Kenneth E. Bush, Maryland State Fire Marshal's Office, MD [E]
Rep. International Fire Marshals Association

Wayne G. Chip Carson, Carson Associates, Inc., VA [SE]

Luke Cummings, Mayo Clinic, MN [U]

Samuel S. Dannaway, Coffman Engineers, HI [SE]
Rep. American Society of Safety Professionals

Matthew W. Davy, Arup, MA [SE]

Martin J. Farraher, Siemens Industry, Inc., IL [M]

Anne M. Guglielmo, Code Consultants, Inc., MO [SE]

Robert J. Harmeyer, MSKTD & Associates, IN [SE]
Rep. American Institute of Architects

Kevin Knippa, Texas Health and Human Services Commission, TX [E]

Peter A. Larrimer, US Department of Veterans Affairs, PA [U]

Bret M. Martin, CNA Insurance, NC [I]

Herman McKenzie, The Joint Commission - SIG, IL [E]

James Merrill II, US Department of Health & Human Services, MD [E]
Rep. US Dept. of Health & Human Services/CMS

James S. Peterkin, TLC Engineering, FL [U]
Rep. NFPA Health Care Section

Ben Pethe, Health Care Consultant, FL [SE]

Ajay V. Prasad, JENSEN HUGHES, MD [SE]

G. Brian Prediger, US Army Corps of Engineers, VA [U]

John A. Rickard, P3 Consulting, TX [SE]

Kurt A. Roeper, ASSA ABLOY, CT [M]
Rep. Builders Hardware Manufacturers Assn/Steel Door Institute

Dennis L. Schmitt, Illinois Department of Public Health (IDPH), IL [E]

Deborah L. Shaner, Shaner Life Safety, CO [M]
Rep. Automatic Fire Alarm Association, Inc.

Neil Stinnett, Indiana University Health, IN [U]

Terry L. Victor, Johnson Controls, MD [M]
Rep. National Fire Sprinkler Association

Michael D. Widdekind, Zurich Services Corporation, MD [I]

Alternates

Bruce D. Brooks, BrooksBright, VA [SE]
(Alt. to Robert J. Harmeyer)

Shane M. Clary, Bay Alarm Company, CA [M]
(Alt. to Deborah L. Shaner)

Mitchell Cloninger, Zurich Services Corporation, VA [I]
(Alt. to Michael D. Widdekind)

David A. Dagenais, Partners/Wentworth-Douglass Hospital, NH [U]
(Alt. to James S. Peterkin)

Joshua W. Elvove, Self, CO [SE]
(Alt. to Samuel S. Dannaway)

Michael T. Greco, Oliver Fire Protection & Security, PA [M]
(Alt. to Terry L. Victor)

Adrian Hal Key, P3 Consulting, TX [SE]
(Alt. to John A. Rickard)

David P. Klein, US Department of Veterans Affairs, DC [U]
(Alt. to Peter A. Larrimer)

Colin McKay, Jensen Hughes, MD [SE]
(Alt. to Ajay V. Prasad)

Lennon A. Peake, Koffel Associates, Inc., MD [SE]
(Alt. to William E. Koffel)

Justin A. Schwartz, US Army Corps of Engineers, VA [U]
(Alt. to G. Brian Prediger)

Wesley Springer, Siemens Industry, Inc., FL [M]
(Alt. to Martin J. Farraher)

Kenneth Sun, US Public Health Service, CO [E]
(Alt. to James Merrill II)

Benjamin Youngstrom, Mayo Clinic, MN [U]
(Alt. to Luke Cummings)

Alexander Frederick Zivnuska, Code Consultants, Inc., MO [SE]
(Alt. to Anne M. Guglielmo)

Nonvoting

Pichaya Chantranuwat, Fusion Consultants Co. Ltd/Thailand, Thailand [SE]

David M. Sine, National Center for Patient Safety, MI [U]
Rep. National Association of Psychiatric Health Systems

Gregory E. Harrington, NFPA Staff Liaison

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NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

Committee Scope: This Committee shall have primary responsibility for documents on protection of human life and property from fire and other circumstances capable of

producing similar consequences, and on the emergency movement of people in health care occupancies.

Technical Committee on Industrial, Storage, and Miscellaneous Occupancies

Steven A. Sheldon, *Chair*
Fisher Engineering, Inc., AZ [SE]

Jen Sisco, *Secretary*
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Paul Armstrong, PACCS, CA [M]
Rep. American Wood Council

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Chris L. Butts, Sompo International, NC [I]

Michael Connor, Champion Fire Protection, GA [M]
Rep. Automatic Fire Alarm Association, Inc.

Christopher Culp, Henderson Engineers, Inc., KS [SE]

Ryan Cummings, US Department of Transportation, DC [E]

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Rep. National Fire Sprinkler Association

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Nicholas A. Dawe, Cobb County Fire Marshal's Office, GA [E]

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Luca Fiorentini, TECSA, Italy [SE]

Robert E. Hanson, Savannah River Nuclear Solutions, GA [U]

Jonathan Humble, American Iron and Steel Institute, CT [M]

James Kendzel, American Supply Association, IL [U]
Rep. American Supply Association

Andrew S. Klein, A S Klein Engineering PLLC, WA [U]
Rep. Self Storage Association

Todd Laberge, TLB Fire Protection Engineering, Inc., CA [SE]

Joshua P. McDonald, American Fire Sprinkler Association (AFSA), TX [IM]

Brian L. Olsen, Phillips 66, OK [U]
Rep. American Petroleum Institute

Scot Pruett, Black & Veatch Corporation, KS [SE]

Raja Sajad Hussain, SHE Fire Safety Consultancy, United Arab Emirates [SE]

Cleveland B. Skinker, Bechtel Infrastructure and Power Corporation, VA [SE]

Bruce J. Swiecicki, National Propane Gas Association, IL [IM]
Rep. National Propane Gas Association

Daniel P. Wake, Victaulic Company of America, PA [M]

Michael S. White, Siemens Building Technologies, NC [M]
Rep. National Electrical Manufacturers Association

Ryan Wyse, Refugee-Canyon Joint Fire District/Hebron Fire Department, OH [E]

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Harrison M. Bradstreet, Siemens, IL [M]
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Kathryn M. Cifa, Bechtel National, Inc., VA [SE]
(Alt. to Cleveland B. Skinker)

Richard A. Craig, Compressed Gas Association, VA [M]
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John August Denhardt, American Fire Sprinkler Association (AFSA), TX [IM]
(Alt. to Joshua P. McDonald)

Ralph Kelsey Foster, Savannah River Nuclear Solutions, SC [U]
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Ed Lisinski, American Wood Council (AWC), WI [M]
(Alt. to Paul Armstrong)

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(Alt. to Steven A. Sheldon)

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(Alt. to Sheldon Dacus)

Ryan Sandler, ADT Commercial LLC./Red Hawk Fire Security, CA [M]
(Alt. to Michael Connor)

Jeffrey A. Scott, FP&C Consultants KC LLC, MO [SE]
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(Voting Alt.)

Jen Sisco, NFPA Staff Liaison

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NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

Committee Scope: This Committee shall have primary responsibility for documents on protection of human life and property from fire and other circumstances capable of producing similar consequences, and on the emergency movement of people in industrial and storage occupancies, special structures, and windowless and underground buildings.

Technical Committee on Interior Finish and Contents

Nicholas A. Dawe, *Chair*
Cobb County Fire Marshal's Office, GA [E]

Tracy L. Vecchiarelli, *Secretary*
National Fire Protection Association, MA

Vytenis "Vyto" Babrauskas, Fire Science and Technology Inc., AZ [SE]
Peter S. Cutrer, 7Cs Consulting, ME [SE]
Rick J. Daugherty, City of Fort Thomas Fire Department, KY [L]
Rep. International Association of Fire Fighters
Michael W. Evans, Brighton Area Fire Department, MI [E]
Teresa "Tracey" A. Fillmore, Lee Health, FL [U]
Rep. American Society of Interior Designers
William E. Fitch, Phyrefish.com, FL [SE]
Alan Gettelman, Bobrick Washroom Equipment Inc., CO [M]
Marcelo M. Hirschler, GBH International, CA [SE]
Kathleen A. Newman, Firetect, CA [M]
Henry Paszczuk, Connecticut Department of Public Safety, CT [E]
Milosh T. Puchovsky, Worcester Polytechnic Institute, MA [SE]
James R. Richardson, Lisle Woodridge Fire District, IL [E]
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Timothy Earl, GBH International, MI [SE]
(Alt. to Marcelo M. Hirschler)
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(Alt. to David P. Tyree)
Joseph Kingston, Connecticut Office of State Fire Marshal, CT [E]
(Alt. to Henry Paszczuk)
James K. Lathrop, Koffel Associates, Inc., CT [M]
(Alt. to Alan Gettelman)
Cori Leffler, Firetect, CA [M]
(Alt. to Kathleen A. Newman)
Katherine S. Setser, Miami University, OH [U]
(Alt. to Teresa "Tracey" A. Fillmore)

Tracy L. Vecchiarelli, NFPA Staff Liaison

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NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

Committee Scope: This Committee shall have primary responsibility for documents on limiting the impact of interior finish, furnishings and building contents on protection of human life and property from fire and other circumstances capable of producing similar consequences, and on the emergency movement of people.

Technical Committee on Means of Egress

David S. Collins, *Chair*
The Preview Group, Inc., OH [SE]

Gregory E. Harrington, *Secretary*
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Rep. The Safe Evacuation Coalition

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Rep. American Society for Healthcare Engineering

Kenneth E. Bush, Maryland State Fire Marshal's Office, MD [E]
Rep. International Fire Marshals Association

Jason R. Clayton, Verisk Analytics/Insurance Services Office, Inc., NJ [I]

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Rep. Michigan Fire Inspectors Society

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Rep. US General Services Administration

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Michelle Renee Gebhart, Jensen Hughes, TX [SE]

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Rep. American Society of Interior Designers

Bryan Lawrence Hoskins, Oklahoma State University, OK [SE]

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Rep. Automatic Fire Alarm Association, Inc.

Marc Mueller, TK Elevator Americas/Thyssenkrupp Elevator, TN [M]
Rep. National Elevator Industry Inc.

Denise L. Pappas, Keltron Corporation, MA [M]
Rep. National Electrical Manufacturers Association

Jake Pauls, Jake Pauls Consulting Services, Canada [C]
Rep. American Public Health Association

Vincent Quinterno, Rhode Island State Fire Marshal's Office, RI [E]

Mitchell Ramseur, M. Ramseur & Associates, PLLC., GA [SE]

Kenneth Saks, US National Institutes of Health, MD [U]

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Michael Tierney, Kellen Company, CT [M]
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(Voting Alt.)

Virginia R. Charter, Oklahoma State University, OK [SE]
(Alt. to Bryan Lawrence Hoskins)

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(Alt. to Joshua W. Elvove)

Paul L. Dove, Coldwater, MI [E]
(Alt. to Ronald R. Farr)

Stanley C. Harbuck, School of Building Inspection, MA [C]
(Alt. to Jake Pauls)

Ryan W. Hoffer, Verisk ISO, NM [I]
(Alt. to Jason R. Clayton)

William E. Koffel, Koffel Associates, Inc., MD [SE]
(Alt. to James K. Lathrop)

Josh Lambert, University of Texas at Austin, TX [U]
(Alt. to Waymon Jackson)

John Lechman, Department of Veteran Affairs, Veterans Health Administration Central Office, DC [U]
(Alt. to Brian A. Marcyjanik)

Maria B. Marks, Siemens Industry, Inc., MD [M]
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Eduardo Martin, Devecem Iberica, France [IM]
(Alt. to J. Francois Simard)

Paul J. Richards, National Institute of Health (NIH)- Division of the Fire Marshal, MD [U]
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Jon G. Roberts, UL LLC, OK [RT]
(Alt. to Michael S. Shulman)

Jonathan Shimshoni, Escape Rescue Systems Ltd., Israel [M]
(Alt. to Ryan Alles)

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Steven J. Whitman, Coffman Engineers, MD [SE]
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Reginald D. Jackson, US Department of Labor, DC [E]
Rep. Occupational Safety & Health Administration

Gregory E. Harrington, NFPA Staff Liaison

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NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

Committee Scope: This Committee shall have primary responsibility for documents on the general requirements for safe egress for protection of human life from fire and other circumstances capable of producing similar consequences, and on the nonemergency and emergency movement of people.

Technical Committee on Mercantile and Business Occupancies

Amy J. Murdock, *Chair*
Code Consultants, Inc., MO [SE]

Jen Sisco, *Secretary*
National Fire Protection Association, MA

Mohammed Alsulaiti, State of Qatar Ministry of Interior-Qatar Civil Defense, Qatar [E]

Tracey D. Bellamy, Telgian Corporation, GA [U]
Rep. The Home Depot

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Rep. National Fire Sprinkler Association

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Rep. International Fire Marshals Association

Kina Campbell, Koffel Associates, MD [SE]

Anthony W. Cole, Wal-Mart Stores, Inc., CA [U]

Nicholas A. Dawe, Cobb County Fire Marshal's Office, GA [E]

Kevin L. Derr, US Architect of the Capitol, DC [E]

Scott Donovan, Winter Park Fire Department, FL [E]

Daniel Ford, WSP Middle East, United Arab Emirates [SE]

David W. Frable, US General Services Administration, IL [U]

Douglas R. Freels, Oak Ridge National Laboratory, TN [U]

Marvin Dwayne Garriss, Synergy Consortium Group, LLC, GA [M]
Rep. Fire Equipment Manufacturers' Association

Joseph R. Garzone, Siemens Industries, Inc., MI [M]
Rep. National Electrical Manufacturers Association

Jonathan Humble, American Iron and Steel Institute, CT [M]

Matthew M. Hunter, American Wood Council, PA [M]
Rep. American Wood Council

Jeff Martin, Elite Fire Protection, Canada [IM]
Rep. National Association of Fire Equipment Distributors

David Parrish, Travelers Insurance, NC [I]

Mitchell Ramseur, M. Ramseur & Associates, PLLC., GA [SE]

Sarah A. Rice, The Preview Group, Inc., OH [SE]

Jeffrey Shirey, University of Maryland - Office of the Fire Marshal, MD [E]

Warren G. Stocker, The Albertson Companies, CA [U]

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Timothy Wensus, Jensen Hughes, RI [SE]

Alternates

Mark J. Aaby, WSP USA, SC [SE]
(Alt. to Daniel Ford)

Clay P. Aler, Koffel Associates, Inc., MD [SE]
(Alt. to Kina Campbell)

Andrew G. Berezowski, Honeywell Inc., CT [M]
(Alt. to Joseph R. Garzone)

Conor J. Kauffman, Kauffman Company, TX [M]
(Alt. to Cecil Bilbo, Jr.)

Sean Kostka, Johnson Controls - Grinnell, AZ [M]
(Alt. to Sheryl A. Tricocci)

Daniel R. Nicholson, Walmart Stores, Inc., AR [U]
(Alt. to Anthony W. Cole)

Leonard J. Ramo, Telgian Corporation, GA [U]
(Alt. to Tracey D. Bellamy)

Terry Schultz, Code Consultants, Inc., MO [SE]
(Alt. to Amy J. Murdock)

David P. Tyree, American Wood Council, CO [M]
(Alt. to Matthew M. Hunter)

David Vetter, Travelers, MN [I]
(Alt. to David Parrish)

Nicole Welch, Interface Engineering, OR [M]
(Alt. to David Michael Szymanski)

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Jen Sisco, NFPA Staff Liaison

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Committee Scope: This Committee shall have primary responsibility for documents on protection of human life and property from fire and other circumstances capable of producing similar consequences, and for the emergency movement of people in mercantile and business occupancies.

Technical Committee on Residential Occupancies

James K. Lathrop, *Chair*
Koffel Associates, Inc., CT [SE]

Ali Al-Mannai, State of Qatar-Ministry of Interior General Administration of Civil Defense, Qatar [E]

Martin R. Anderson, Siemens Building Technologies, Inc., IL [M]
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Rep. International Fire Marshals Association

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Bradford T. Cronin, Strategic Code Solutions LLC., MA [E]
Rep. Rhode Island Association of Fire Marshals

Michael Scott Custer, Fort Detrick Fire Department, MD [E]

Nicholas A. Dawe, Cobb County Fire Marshal's Office, GA [E]

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Kenneth E. Isman, University of Maryland, MD [SE]

Josh Lambert, University of Texas at Austin, TX [U]

Mark Larson, Mark Larson and Associates LLC, ID [U]
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Ed Lisinski, American Wood Council (AWC), WI [M]

Eric N. Mayl, Core Engineers Consulting Group, LLC, DC [SE]

Henry Paszczuk, Connecticut Department of Public Safety, CT [E]

William Davison Pullen, Marriott International, Inc., MD [U]

Mitchell Ramseur, M. Ramseur & Associates, PLLC., GA [SE]

Shamim Rashid-Sumar, National Ready Mixed Concrete Assn., NY [M]
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Richard Jay Roberts, Honeywell Fire Safety, IL [M]
Rep. National Electrical Manufacturers Association

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John A. Sharry, Beakmann Properties, CA [U]

Kevin Spangler, Michael Baker International, PA [SE]

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(Alt. to Roland A. Asp)

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(Alt. to Harry L. Bradley)

Stephen Ganoe, NFPA Staff Liaison

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Committee Scope: This Committee shall have primary responsibility for documents on protection of human life and property from fire and other circumstances capable of producing similar consequences, and on the emergency movement of people in hotels, dormitories, apartments, lodging and rooming houses, and one- and two-family dwellings.

Contents

NFPA 101

Life Safety Code

2024 Edition

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UPDATES, ALERTS, AND FUTURE EDITIONS: New editions of NFPA codes, standards, recommended practices, and guides (i.e., NFPA Standards) are released on scheduled revision cycles. This edition may be superseded by a later one, or it may be amended outside of its scheduled revision cycle through the issuance of Tentative Interim Amendments (TIAs). An official NFPA Standard at any point in time consists of the current edition of the document, together with all TIAs and Errata in effect. To verify that this document is the current edition or to determine if it has been amended by TIAs or Errata, please consult the National Fire Codes® Subscription Service or the "List of NFPA Codes & Standards" at www.nfpa.org/docinfo. In addition to TIAs and Errata, the document information pages also include the option to sign up for alerts for individual documents and to be involved in the development of the next edition.

NOTICE: An asterisk (*) following the number or letter designating a paragraph indicates that explanatory material on the paragraph can be found in Annex A.

A reference in brackets [ ] following a section or paragraph indicates material that has been extracted from another NFPA document. Extracted text may be edited for consistency and style and may include the revision of internal paragraph references and other references as appropriate. Requests for interpretations or revisions of extracted text shall be sent to the technical committee responsible for the source document.

Information on referenced and extracted publications can be found in Chapter 2 and Annex E.

Chapter 1 Administration

1.1* Scope.

1.1.1 Title. NFPA *101, Life Safety Code,* shall be known as the *Life Safety Code®*, is cited as such, and shall be referred to herein as "this *Code*" or "the *Code*."

1.1.2 Danger to Life from Fire. The *Code* addresses those construction, protection, and occupancy features necessary to minimize danger to life from the effects of fire, including smoke, heat, and toxic gases created during a fire.

1.1.3 Egress Facilities. The *Code* establishes minimum criteria for the design of egress facilities so as to allow prompt escape of occupants from buildings or, where desirable, into safe areas within buildings.

1.1.4 Other Fire-Related Considerations. The *Code* addresses other considerations that are essential to life safety in recognition of the fact that life safety is more than a matter of egress. The *Code* also addresses protective features and systems, building services, operating features, maintenance activities, and other provisions in recognition of the fact that achieving an acceptable degree of life safety depends on additional safeguards to provide adequate egress time or protection for people exposed to fire.

1.1.5* Hazardous Materials Emergencies. The *Code* also addresses other considerations that provide for occupant protection during emergency events involving hazardous materials.

1.1.6 Injuries from Falls. The *Code* also addresses reducing injury to occupants from falls.

1.1.7 Emergency Communications. The *Code* also addresses other considerations that provide for communications to occupants under emergency conditions and to others.

1.1.8* Considerations Not Related to Fire. The *Code* also addresses other considerations that, while important in fire conditions, provide an ongoing benefit in other conditions of use, including non-fire emergencies.

1.1.9 Areas Not Addressed. The *Code* does not address the following:

(1)* General fire prevention or building construction features that are normally a function of fire prevention codes and building codes
(2) Prevention of injury incurred by an individual due to that individual's failure to use reasonable care
(3) Preservation of property from loss by fire
(4) The retail sale and associated storage of consumer fireworks

1.2* Purpose. The purpose of this *Code* is to provide minimum requirements, with due regard to function, for the design, operation, and maintenance of buildings and structures for safety to life from fire. Its provisions will also aid life safety in similar emergencies.

1.3 Application.

1.3.1* New and Existing Buildings and Structures. The *Code* shall apply to both new construction and existing buildings and existing structures.

1.3.2 Vehicles and Vessels. The *Code* shall apply to vehicles, vessels, or other similar conveyances, as specified in Section 11.6, in which case such vehicles and vessels shall be treated as buildings.

1.4* Equivalency. Nothing in this *Code* is intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety over those prescribed by this *Code*.

1.4.1 Technical Documentation. Technical documentation shall be submitted to the authority having jurisdiction to demonstrate equivalency.

1.4.2 Approval. The system, method, or device shall be approved for the intended purpose by the authority having jurisdiction.

1.4.3* Equivalent Compliance. Alternative systems, methods, or devices approved as equivalent by the authority having jurisdiction shall be recognized as being in compliance with this *Code*.

1.5 Units and Formulas.

1.5.1 SI Units. Metric units of measurement in this *Code* are in accordance with the modernized metric system known as the International System of Units (SI).

1.5.2 Primary Values. The inch-pound value for a measurement, and the SI value given in parentheses, shall each be acceptable for use as primary units for satisfying the requirements of this *Code*.

1.6 Enforcement. This *Code* shall be administered and enforced by the authority having jurisdiction designated by the governing authority.

Chapter 2 Referenced Publications

2.1 General. The documents referenced in this chapter, or portions of such documents, are referenced within this *Code*, shall be considered part of the requirements of this *Code*, and the following shall also apply:

(1)* Documents referenced in this chapter, or portion of such documents, shall only be applicable to the extent called for within other chapters of this *Code*.

(2) Where the requirements of a referenced code or standard differ from the requirements of this *Code*, the requirements of this *Code* shall govern.

(3)* Existing buildings or installations that do not comply with the provisions of the codes or standards referenced in this chapter shall be permitted to be continued in service, provided that the lack of conformity with these documents does not present a serious hazard to the occupants as determined by the authority having jurisdiction.

Δ **2.2* NFPA Publications.** National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 1, *Fire Code,* 2024 edition.

NFPA 4, *Standard for Integrated Fire Protection and Life Safety System Testing,* 2024 edition.

NFPA 10, *Standard for Portable Fire Extinguishers,* 2022 edition.

NFPA 11, *Standard for Low-, Medium-, and High-Expansion Foam,* 2021 edition.

NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems,* 2022 edition.

NFPA 12A, *Standard on Halon 1301 Fire Extinguishing Systems,* 2022 edition.

NFPA 13, *Standard for the Installation of Sprinkler Systems,* 2022 edition.

NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes,* 2022 edition.

NFPA 13R, *Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies,* 2022 edition.

NFPA 14, *Standard for the Installation of Standpipe and Hose Systems,* 2024 edition.

NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection,* 2022 edition.

NFPA 17, *Standard for Dry Chemical Extinguishing Systems,* 2024 edition.

NFPA 17A, *Standard for Wet Chemical Extinguishing Systems,* 2024 edition.

NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection,* 2022 edition.

NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems,* 2023 edition.

NFPA 30, *Flammable and Combustible Liquids Code,* 2024 edition.

NFPA 30B, *Code for the Manufacture and Storage of Aerosol Products,* 2023 edition.

NFPA 31, *Standard for the Installation of Oil-Burning Equipment,* 2020 edition.

NFPA 37, *Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines,* 2021 edition.

NFPA 40, *Standard for the Storage and Handling of Cellulose Nitrate Film,* 2022 edition.

NFPA 45, *Standard on Fire Protection for Laboratories Using Chemicals,* 2024 edition.

NFPA 54, *National Fuel Gas Code,* 2024 edition.

NFPA 55, *Compressed Gases and Cryogenic Fluids Code,* 2023 edition.

NFPA 58, *Liquefied Petroleum Gas Code,* 2024 edition.

NFPA 70®, National Electrical Code®, 2023 edition.

NFPA 72®, National Fire Alarm and Signaling Code®, 2022 edition.

NFPA 80, *Standard for Fire Doors and Other Opening Protectives,* 2022 edition.

NFPA 82, *Standard on Incinerators and Waste and Linen Handling Systems and Equipment,* 2019 edition.

NFPA 88A, *Standard for Parking Structures,* 2023 edition.

NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems,* 2024 edition.

NFPA 90B, *Standard for the Installation of Warm Air Heating and Air-Conditioning Systems,* 2024 edition.

NFPA 91, *Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Noncombustible Particulate Solids,* 2020 edition.

NFPA 92, *Standard for Smoke Control Systems,* 2021 edition.

NFPA 96, *Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations,* 2024 edition.

NFPA 99, *Health Care Facilities Code,* 2024 edition.

NFPA 101A, *Guide on Alternative Approaches to Life Safety,* 2022 edition.

NFPA 105, *Standard for Smoke Door Assemblies and Other Opening Protectives,* 2022 edition.

NFPA 110, *Standard for Emergency and Standby Power Systems,* 2022 edition.

NFPA 111, *Standard on Stored Electrical Energy Emergency and Standby Power Systems,* 2022 edition.

NFPA 150, *Fire and Life Safety in Animal Housing Facilities Code,* 2022 edition.

NFPA 160, *Standard for the Use of Flame Effects Before an Audience,* 2021 edition.

NFPA 170, *Standard for Fire Safety and Emergency Symbols,* 2021 edition.

NFPA 204, *Standard for Smoke and Heat Venting,* 2021 edition.

NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel–Burning Appliances,* 2024 edition.

NFPA 220, *Standard on Types of Building Construction,* 2024 edition.

NFPA 221, *Standard for High Challenge Fire Walls, Fire Walls, and Fire Barrier Walls,* 2021 edition.

NFPA 241, *Standard for Safeguarding Construction, Alteration, and Demolition Operations,* 2022 edition.

NFPA 252, *Standard Methods of Fire Tests of Door Assemblies,* 2022 edition.

NFPA 253, *Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source,* 2023 edition.

NFPA 257, *Standard on Fire Test for Window and Glass Block Assemblies,* 2022 edition.

NFPA 259, *Standard Test Method for Potential Heat of Building Materials,* 2023 edition.

NFPA 260, *Standard Methods of Tests and Classification System for Cigarette Ignition Resistance of Components of Upholstered Furniture,* 2024 edition.

NFPA 261, *Standard Method of Test for Determining Resistance of Mock-Up Upholstered Furniture Material Assemblies to Ignition by Smoldering Cigarettes,* 2023 edition.

NFPA 265, *Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile or Expanded Vinyl Wall Coverings on Full Height Panels and Walls,* 2023 edition.

NFPA 286, *Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth,* 2024 edition.

NFPA 288, *Standard Methods of Fire Tests of Horizontal Fire Door Assemblies Installed in Horizontal Fire Resistance–Rated Assemblies,* 2022 edition.

NFPA 289, *Standard Method of Fire Test for Individual Fuel Packages,* 2023 edition.

NFPA 400, *Hazardous Materials Code,* 2022 edition.

NFPA 415, *Standard on Airport Terminal Buildings, Fueling Ramp Drainage, and Loading Walkways,* 2022 edition.

NFPA 418, *Standard for Heliports,* 2021 edition.

NFPA 495, *Explosive Materials Code,* 2023 edition.

NFPA 701, *Standard Methods of Fire Tests for Flame Propagation of Textiles and Films,* 2023 edition.

NFPA 703, *Standard for Fire-Retardant-Treated Wood and Fire-Retardant Coatings for Building Materials,* 2024 edition.

NFPA 731, *Standard for the Installation of Premises Security Systems,* 2023 edition.

NFPA 750, *Standard on Water Mist Fire Protection Systems,* 2023 edition.

NFPA 770, *Standard on Hybrid (Water and Inert Gas) Fire-Extinguishing Systems,* 2021 edition.

NFPA 855, *Standard for the Installation of Stationary Energy Storage Systems,* 2023 edition.

NFPA 914, *Code for the Protection of Historic Structures,* 2023 edition.

NFPA 1126, *Standard for the Use of Pyrotechnics Before a Proximate Audience,* 2021 edition.

NFPA 1225, *Standard for Emergency Services Communications,* 2022 edition.

NFPA 2001, *Standard on Clean Agent Fire Extinguishing Systems,* 2022 edition.

NFPA 5000®, Building Construction and Safety Code®, 2024 edition.

2.3 Other Publications.

Δ **2.3.1 ACI Publications.** American Concrete Institute, 38800 Country Club Drive, Farmington Hills, MI 48331-3439. www.concrete.org

ACI 216.1, *Code Requirements for Determining Fire Resistance of Concrete and Masonry Construction Assemblies*, 2014 (reapproved 2019).

Δ **2.3.2 ANSI Publications.** American National Standards Institute, Inc., 25 West 43rd Street, 4th floor, New York, NY 10036. www.ansi.org

ANSI ASC A14.3, *American National Standard for Ladders — Fixed — Safety Requirements*, 2008 (reaffirmed 2018).

2.3.3 ASCE Publications. American Society of Civil Engineers, 1801 Alexander Bell Drive, Reston, VA 20191-4400. www.asce.org

ASCE/SEI 7, *Minimum Design Loads for Buildings and Other Structures*, 2022.

ASCE/SEI/SFPE 29, *Standard Calculation Methods for Structural Fire Protection*, 2005.

2.3.4 ASME Publications. The American Society of Mechanical Engineers, Two Park Avenue, New York, NY 10016-5990. www.asme.org

ASME A17.1/CSA B44, *Safety Code for Elevators and Escalators*, 2019.

ASME A17.3, *Safety Code for Existing Elevators and Escalators*, 2020.

ASME A17.7/CSA B44.7, *Performance-Based Safety Code for Elevators and Escalators*, 2007, reaffirmed 2012.

2.3.5 ASSP Publications. American Society of Safety Professionals, 520 N. Northwest Highway, Park Ridge, IL 60068. www.assp.org

ANSI/ASSP A1264.1, *Safety Requirements for Workplace Walking/Working Surfaces and Their Access; Workplace Floor, Wall and Roof Openings; Stairs and Guardrail/Handrail Systems*, 2017.

2.3.6 ASTM Publications. ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959. www.astm.org

ASTM C1629/C1629M, *Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels*, 2019.

ASTM D1929, *Standard Test Method for Determining Ignition Temperatures of Plastics*, 2020.

ASTM D2859, *Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials*, 2016 (2021).

ASTM D2898, *Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing*, 2010 (2017).

ASTM D3201/D3201M, *Standard Test Method for Hygroscopic Properties of Fire-Retardant Wood and Wood-Based Products*, 2020.

ASTM D5516, *Standard Test Method for Evaluating the Flexural Properties of Fire-Retardant Treated Softwood Plywood Exposed to Elevated Temperatures*, 2018.

ASTM D5664, *Standard Test Method for Evaluating the Effects of Fire-Retardant Treatments and Elevated Temperatures on Strength Properties of Fire-Retardant Treated Lumber*, 2017.

ASTM D6305, *Standard Practice for Calculating Bending Strength Design Adjustment Factors for Fire-Retardant-Treated Plywood Roof Sheathing*, 2021.

ASTM D6841, *Standard Practice for Calculating Design Value Treatment Adjustment Factors for Fire-Retardant-Treated Lumber*, 2021.

ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, 2022.

ASTM E108, *Standard Test Methods for Fire Tests of Roof Coverings*, 2020a.

ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, 2020.

ASTM E136, *Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C*, 2022.

ASTM E648, *Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source*, 2019a e1.

ASTM E814, *Standard Test Method for Fire Tests of Penetration Firestop Systems*, 2013a (2017).

ASTM E1354, *Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter*, 2022a.

ASTM E1537, *Standard Test Method for Fire Testing of Upholstered Furniture*, 2022.

ASTM E1590, *Standard Test Method for Fire Testing of Mattresses*, 2022.

ASTM E1591, *Standard Guide for Obtaining Data for Fire Growth Models*, 2020.

ASTM E1966, *Standard Test Method for Fire-Resistive Joint Systems*, 2015 (2019).

ASTM E2072, *Standard Specification for Photoluminescent (Phosphorescent) Safety Markings*, 2014.

ASTM E2073, *Standard Test Method for Photopic Luminance of Photoluminescent (Phosphorescent) Markings*, 2019a.

ASTM E2307, *Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus*, 2020.

ASTM E2404, *Standard Practice for Specimen Preparation and Mounting of Textile, Paper or Polymeric (Including Vinyl) and Wood Wall or Ceiling Coverings, Facings and Veneers, to Assess Surface Burning Characteristics*, 2017.

ASTM E2573, *Standard Practice for Specimen Preparation and Mounting of Site-Fabricated Stretch Systems to Assess Surface Burning Characteristics*, 2019.

ASTM E2579, *Standard Practice for Specimen Preparation and Mounting of Wood Products to Assess Surface Burning Characteristics*, 2021.

ASTM E2599, *Standard Practice for Specimen Preparation and Mounting of Reflective Insulation, Radiant Barrier and Vinyl Stretch Ceiling Materials for Building Applications to Assess Surface Burning Characteristics*, 2018.

ASTM E2652, *Standard Test Method for Assessing Combustibility of Materials Using a Tube Furnace with a Cone-shaped Airflow Stabilizer, at 750°C*, 2018.

ASTM E2768, *Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test)*, 2011 (2018).

ASTM E2837, *Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies*, 2013 (2017).

ASTM E2965, *Standard Test Method for Determination of Low Levels of Heat Release Rate for Materials and Products Using an Oxygen Consumption Calorimeter*, 2022.

ASTM E3082, *Standard Test Methods for Determining the Effectiveness of Fire Retardant Treatments for Natural Christmas Trees*, 2020.

ASTM F851, *Standard Test Method for Self-Rising Seat Mechanisms*, 1987 (2020).

ASTM F1085, *Standard Specification for Mattress and Box Springs for Use in Berths in Marine Vessels*, 2019.

ASTM F1577, *Standard Test Methods for Detention Locks for Swinging Doors*, 2005 (2019).

ASTM F2374, *Standard Practice for Design, Manufacture, Operation, and Maintenance of Inflatable Amusement Devices*, 2021a.

ASTM G155, *Standard Practice for Operating Xenon Arc Lamp Apparatus for Exposure of Materials*, 2021.

N **2.3.7 BHMA Publications.** Builders Hardware Manufacturers Association, 355 Lexington Avenue, 15th Floor, New York, NY 10017. www.buildershardware.com

ANSI/BHMA A156.3, *Exit Devices*, 2020.

ANSI/BHMA A156.10, *Power Operated Pedestrian Doors*, 2017.

ANSI/BHMA A156.19, *Power Assist and Low Energy Power Operated Doors*, 2019.

ANSI/BHMA A156.27, *Power and Manual Operated Revolving Pedestrian Doors*, 2019.

ANSI/BHMA A156.38, *Low Energy Power Operated Sliding and Folding Doors*, 2019.

Δ 2.3.8 FM Publications. FM Global, 270 Central Avenue, Johnston, RI 02919. www.fmglobal.com

ANSI/FM Approvals 4880, *American National Standard for Evaluating the Fire Performance of Insulated Building Panel Assemblies and Interior Finish Materials*, 2017.

FM Approvals 6920/6921, *Oily Waste Cans and Containers for Combustible Waste*, 2019.

Δ 2.3.9 ICC Publications. International Code Council, 500 New Jersey Avenue, NW, 6th Floor, Washington, DC 20001. www.iccsafe.org

ICC A117.1, *Accessible and Usable Buildings and Facilities*, 2017.

2.3.10 RESNA Publications. Rehabilitation Engineering and Assistive Technology Society of North America, 1560 Wilson Blvd., Suite 850, Arlington, VA 22209.

ANSI/RESNA ED-1, *Emergency Stair Travel Devices Used by Individuals with Disabilities, Volume 1*, 2019.

2.3.11 UL Publications. Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096. www.ul.com

UL 9, *Fire Tests of Window Assemblies*, 2009, revised 2020.

UL 10B, *Fire Tests of Door Assemblies*, 2008, revised 2020.

UL 10C, *Positive Pressure Fire Tests of Door Assemblies*, 2016, revised 2021.

UL 263, *Fire Tests of Building Construction and Materials*, 2011, revised 2022.

UL 294, *Access Control System Units*, 2018.

UL 300, *Fire Testing of Fire Extinguishing Systems for Protection of Commercial Cooking Equipment*, 2019, revised 2022.

UL 300A, *Outline of Investigation for Extinguishing System Units for Residential Range Top Cooking Surfaces*, 2006.

UL 305, *Panic Hardware*, 2012, revised 2022.

UL 555, *Fire Dampers*, 2006, revised 2020.

UL 555S, *Smoke Dampers*, 2014, revised 2020.

UL 723, *Test for Surface Burning Characteristics of Building Materials*, 2018.

UL 790, *Standard Test Methods for Fire Tests of Roof Coverings*, 2022.

UL 924, *Emergency Lighting and Power Equipment*, 2016, revised 2020.

UL 962, *Household and Commercial Furnishings*, 2014, revised 2022.

UL 1034, *Burglary-Resistant Electric Locking Mechanisms*, 2011, revised 2020.

UL 1040, *Fire Test of Insulated Wall Construction*, 1996, revised 2022.

UL 1278, *Movable and Wall- or Ceiling-Hung Electric Room Heaters*, 2014, revised 2022.

UL 1315, *Safety Containers for Waste Paper*, 2022.

UL 1479, *Fire Tests of Penetration Firestops*, 2015, revised 2021.

UL 1489, *Fire Tests of Fire Resistant Pipe Protection Systems Carrying Combustible Liquids*, 2016, revised 2021.

UL 1715, *Fire Test of Interior Finish Material*, 1997, revised 2022.

UL 1784, *Air Leakage Tests of Door Assemblies and Other Opening Protectives*, 2015, revised 2020.

UL 1975, *Fire Tests for Foamed Plastics Used for Decorative Purposes*, 2006.

UL 1994, *Luminous Egress Path Marking Systems*, 2015, revised 2020.

UL 2079, *Tests for Fire Resistance of Building Joint Systems*, 2015, revised 2020.

UL 2525, *Two-Way Emergency Communications Systems for Rescue Assistance*, 2020.

Δ **2.3.12 US Government Publications.** US Government Publishing Office, 732 North Capitol Street, NW, Washington, DC 20401. www.gpo.gov

Title 16, Code of Federal Regulations, Part 1632, "Standard for the Flammability of Mattresses and Mattress Pads" (FF 4-72, Amended).

2.3.13 Other Publications.

Merriam-Webster's Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2020.

Δ **2.4 References for Extracts in Mandatory Sections.**

NFPA 1, *Fire Code*, 2024 edition.

NFPA 13, *Standard for the Installation of Sprinkler Systems*, 2022 edition.

NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*, 2022 edition.

NFPA 13R, *Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies*, 2022 edition.

NFPA 30, *Flammable and Combustible Liquids Code*, 2024 edition.

NFPA 72®, National Fire Alarm and Signaling Code®, 2022 edition.

NFPA 80, *Standard for Fire Doors and Other Opening Protectives*, 2022 edition.

NFPA 88A, *Standard for Parking Structures*, 2023 edition.

NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, 2024 edition.

NFPA 150, *Fire and Life Safety in Animal Housing Facilities Code*, 2022 edition.

NFPA 221, *Standard for High Challenge Fire Walls, Fire Walls, and Fire Barrier Walls*, 2024 edition.

NFPA 252, *Standard Methods of Fire Tests of Door Assemblies*, 2022 edition.

NFPA 301, *Code for Safety to Life from Fire on Merchant Vessels*, 2023 edition.

NFPA 400, *Hazardous Materials Code*, 2022 edition.

NFPA 415, *Standard on Airport Terminal Buildings, Fueling Ramp Drainage, and Loading Walkways*, 2022 edition.

NFPA 703, *Standard for Fire-Retardant-Treated Wood and Fire-Retardant Coatings for Building Materials*, 2024 edition.

NFPA 921, *Guide for Fire and Explosion Investigations*, 2021 edition.

NFPA 5000®, Building Construction and Safety Code®, 2024 edition.

Chapter 3 Definitions

3.1 General. The definitions contained in this chapter shall apply to the terms used in this *Code*. Where terms are not defined in this chapter or within another chapter, they shall be defined using their ordinarily accepted meanings within the context in which they are used. *Merriam-Webster's Collegiate Dictionary*, 11th edition, shall be the source for the ordinarily accepted meaning.

3.2 NFPA Official Definitions.

3.2.1* Approved. Acceptable to the authority having jurisdiction.

3.2.2* Authority Having Jurisdiction (AHJ). An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

3.2.3* Code. A standard that is an extensive compilation of provisions covering broad subject matter or that is suitable for adoption into law independently of other codes and standards.

3.2.4 Labeled. Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

3.2.5* Listed. Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.

3.2.6 Shall. Indicates a mandatory requirement.

3.2.7 Should. Indicates a recommendation or that which is advised but not required.

3.3 General Definitions.

3.3.1 Accessible Area of Refuge. See 3.3.25.1.

3.3.2 Accessible Means of Egress. See 3.3.185.1.

3.3.3 Accessible Route. A continuous unobstructed path that complies with this *Code* and ICC A117.1, *Accessible and Usable Buildings and Facilities.* (SAF-MEA)

3.3.4* Actuating Member or Bar. The activating mechanism of a panic hardware or fire exit hardware device located on the egress side of a door. (SAF-MEA)

3.3.5 Addition. An increase in building area, aggregate floor area, building height, or number of stories of a structure. (SAF-FUN)

3.3.6 Airport Traffic Control Tower. See 3.3.303.1.

3.3.7 Aircraft Loading Walkway. An aboveground device through which passengers move between a point in an airport terminal building and an aircraft. Included in this category are walkways that are essentially fixed and permanently placed, or walkways that are essentially mobile in nature and that fold, telescope, or pivot from a fixed point at the airport terminal building. [**415,** 2022] (SAF-AXM)

3.3.8 Air-Inflated Structure. See 3.3.293.1.

3.3.9 Airport Terminal Building. See 3.3.37.1.

3.3.10 Air-Supported Structure. See 3.3.293.2.

3.3.11* Aisle Accessway. The initial portion of an exit access that leads to an aisle. (SAF-AXM)

3.3.12 Aisle Ramp. See 3.3.238.1.

3.3.13 Aisle Stair. See 3.3.286.1.

3.3.14 Alarm.

N **3.3.14.1** ***Carbon Monoxide Alarm.*** A single- or multiple-station alarm responsive to carbon monoxide. [**72,** 2022] (SAF-BSF)

N **3.3.14.2** ***Initiating Device.*** A system component that originates transmission of a change-of-state condition, such as in a smoke detector, manual fire alarm box, or supervisory switch. [**72,** 2022]

3.3.14.3 ***Single-Station Alarm.*** A detector comprising an assembly that incorporates a sensor, control components, and an alarm notification appliance in one unit operated from a power source either located in the unit or obtained at the point of installation. [**72,** 2022] (SAF-BSF)

3.3.14.4 ***Smoke Alarm.*** A single or multiple-station alarm responsive to smoke. [**72,** 2022] (SAF-BSF)

N **3.3.15 Alcohol-Based Hand-Rub (ABHR).** An alcohol-containing preparation designed for application to the hands for reducing the number of visible microorganisms on the hands and containing ethanol or isopropanol in an amount not exceeding 95 percent by volume. [**30,** 2024] (SAF-FIR)

N **3.3.16* Alternate Care Site (ACS).** Any building, structure, or portion thereof not currently being used for health care that is temporarily reoccupied, converted, constructed, or relocated for health care use during an urgent need in capacity to provide additional capability for an affected community. (SAF-HEA)

3.3.17 Alternative Calculation Procedure. A calculation procedure that differs from the procedure originally employed by the design team but that provides predictions for the same variables of interest. (SAF-FUN)

3.3.18 Ambulatory Health Care Occupancy. See 3.3.205.1.

3.3.19 Analysis.

3.3.19.1 ***Sensitivity Analysis.*** An analysis performed to determine the degree to which a predicted output will vary given a specified change in an input parameter, usually in relation to models. (SAF-FUN)

3.3.19.2 ***Uncertainty Analysis.*** An analysis performed to determine the degree to which a predicted value will vary. (SAF-FUN)

3.3.20 Anchor Building. See 3.3.37.2.

3.3.21* Animal Housing Facility. Area of a building or structure, including interior and adjacent exterior spaces, where animals are fed, rested, worked, exercised, treated, exhibited, or used for production. [**150,** 2016] (SAF-FUN)

3.3.22 Apartment Building. See 3.3.37.3.

3.3.23 Approved Existing. See 3.3.86.1.

3.3.24 Area.

3.3.24.1 ***Detention and Correctional Residential Housing Area.*** Sleeping areas and any contiguous day room, group activity space, or other common space for customary access of residents. (SAF-DET)

3.3.24.2 ***Floor Area.***

3.3.24.2.1* ***Clear Floor Area.*** Floor area that is accessible and unobstructed. (SAF-MEA)

3.3.24.2.2* ***Gross Floor Area.*** The floor area within the inside perimeter of the outside walls, or the outside walls and fire walls of a building, or outside and/or inside walls that bound an occupancy or incidental use area with no deductions for hallways, stairs, closets, thickness of interior walls, columns, elevator and building services shafts, or

other features, but excluding floor openings associated with atriums and communicating spaces. (SAF-MEA)

3.3.24.2.3* ***Gross Floor Area (Health Care and Ambulatory Health Care Occupancies).*** For determining the areas of smoke compartments in health care and ambulatory health care occupancies and determining the areas of health care suites, the floor area within the inside perimeter of the outside walls, or the outside walls and fire walls of a building, or outside and/or inside walls that bound an occupancy or incidental use area with no deductions for hallways, closets, thickness of interior walls, columns, or other features, but excluding floor openings associated with atriums and communicating spaces. (SAF-HEA)

3.3.24.2.4 ***Net Floor Area.*** The floor area within the inside perimeter of the outside walls, or the outside walls and fire walls of a building, or outside and/or inside walls that bound an occupancy or incidental use area with deductions for hallways, stairs, closets, shafts, thickness of interior walls, columns, and other features. (SAF-MEA)

3.3.24.3 ***Gross Leasable Area.*** Fifty percent of major tenant areas, and 100 percent of all other floor areas designated for tenant occupancy and exclusive use, including storage areas. The area of tenant occupancy is measured from the centerlines of joint partitions to the outside of the tenant walls. (SAF-MER)

3.3.24.4* ***Hazardous Area.*** An area of a structure or building that poses a degree of hazard greater than that normal to the general occupancy of the building or structure. (SAF-FIR)

3.3.24.5 ***Living Area.*** Any normally occupiable space in a residential occupancy, other than sleeping rooms or rooms that are intended for combination sleeping/living, bathrooms, toilet compartments, kitchens, closets, halls, storage or utility spaces, and similar areas. (SAF-RES)

3.3.24.6* ***Normally Unoccupied Building Service Equipment Support Area.*** A building service equipment support area in which people are not expected to be present on a regular basis. (SAF-MEA)

3.3.24.7 ***Occupiable Area.*** An area of a facility occupied by people on a regular basis. (SAF-FUN)

3.3.24.8 ***Rehabilitation Work Area.*** That portion of a building affected by any renovation, modification, or reconstruction work as initially intended by the owner, and indicated as such in the permit, but excluding other portions of the building where incidental work entailed by the intended work must be performed, and excluding portions of the building where work not initially intended by the owner is specifically required. (SAF-FUN)

3.3.25* Area of Refuge. An area that is either (1) a story in a building where the building is protected throughout by an approved, supervised automatic sprinkler system and has not less than two accessible rooms or spaces separated from each other by smoke-resisting partitions; or (2) a space located in a path of travel leading to a public way that is protected from the effects of fire, either by means of separation from other spaces in the same building or by virtue of location, thereby permitting a delay in egress travel from any level. (SAF-MEA)

3.3.25.1 ***Accessible Area of Refuge.*** An area of refuge that complies with the accessible route requirements of ICC A117.1, *Accessible and Usable Buildings and Facilities*. (SAF-MEA)

3.3.26 Assembly.

3.3.26.1 ***Door Assembly.*** Any combination of a door, frame, hardware, and other accessories that is placed in an opening in a wall that is intended primarily for access or for human entrance or exit. [**252,** 2022] (SAF-MEA)

3.3.26.1.1 ***Fire Door Assembly.*** Any combination of a fire door, a frame, hardware, and other accessories that together provide a specific degree of fire protection to the opening. [**80,** 2022] (SAF-FIR)

Δ **3.3.26.1.1.1** ***Floor Fire Door Assembly.*** A combination of a fire door, a frame, hardware, and other accessories installed in a horizontal plane that together provide a specific degree of fire protection to a through-opening in a fire-resistance-rated floor. [**80,** 2022] (SAF-FIR)

3.3.26.2 ***Fire Window Assembly.*** A window or glass block assembly having a fire protection rating. [**80,** 2022] (SAF-FIR)

3.3.27 Assembly Occupancy. See 3.3.205.2.

3.3.28 Atmosphere.

3.3.28.1 ***Common Atmosphere.*** The atmosphere that exists between rooms, spaces, or areas within a building that are not separated by an approved smoke barrier. (SAF-END)

3.3.28.2 ***Separate Atmosphere.*** The atmosphere that exists between rooms, spaces, or areas that are separated by an approved smoke barrier. (SAF-END)

3.3.29* Atrium. A large-volume space created by a floor opening or series of floor openings connecting two or more stories that is covered at the top of the series of openings and is used for purposes other than an enclosed stairway; an elevator hoistway; an escalator opening; or as a utility shaft used for plumbing, electrical, air-conditioning, or communications facilities. (SAF-FIR)

3.3.30* Attic. The space located between the ceiling of a story and the roof directly above that habitable story. (SAF-FUN)

3.3.31 Automatic. Capable of performing a function without the necessity of human intervention. (SAF-FUN)

3.3.32 Barrier.

3.3.32.1* ***Fire Barrier.*** A continuous membrane or a membrane with discontinuities created by protected openings with a specified fire protection rating, where such membrane is designed and constructed with a specified fire resistance rating to limit the spread of fire. (SAF-FIR)

3.3.32.2* ***Smoke Barrier.*** A continuous membrane, or a membrane with discontinuities created by protected openings, where such membrane is designed and constructed to restrict the movement of smoke. (SAF-FIR)

3.3.32.3* ***Thermal Barrier.*** A material that limits the average temperature rise of an unexposed surface to not more than 250°F (139°C) for a specified fire exposure complying with the standard time-temperature curve of ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, or UL 263, *Fire Tests of Building Construction and Materials*. (SAF-BCF)

3.3.33 Basement. Any story of a building wholly or partly below grade plane that is not considered the first story above grade plane. *(See also 3.3.134.1, First Story Above Grade Plane.)* (SAF-FUN)

3.3.34* Birth Center. A facility in which low-risk births are expected following normal, uncomplicated pregnancies, and in which professional midwifery care is provided to women during pregnancy, birth, and postpartum. (SAF-MER)

3.3.35 Bleachers. A grandstand in which the seats are not provided with backrests. (SAF-AXM)

3.3.36 Board and Care. See 3.3.205.12, Residential Board and Care Occupancy.

3.3.37* Building. Any structure used or intended for supporting or sheltering any use or occupancy. (SAF-FUN)

3.3.37.1 ***Airport Terminal Building.*** A structure used primarily for air passenger enplaning or deplaning, including ticket sales, flight information, baggage handling, and other necessary functions in connection with air transport operations. This term includes any extensions and satellite buildings used for passenger handling or aircraft flight service functions. Aircraft loading walkways and "mobile lounges" are excluded. [**415,** 2022] (SAF-AXM)

3.3.37.2 ***Anchor Building.*** A building housing any occupancy having low or ordinary hazard contents and having direct access to a mall structure, but having all required means of egress independent of the mall concourse. (SAF-MER)

3.3.37.3* ***Apartment Building.*** A building or portion thereof containing three or more dwelling units with independent cooking and bathroom facilities. (SAF-RES)

3.3.37.4 ***Bulk Merchandising Retail Building.*** A building in which the sales area includes the storage of combustible materials on pallets, in solid piles, or in racks in excess of 12 ft (3660 mm) in storage height. (SAF-MER)

3.3.37.5* ***Existing Building.*** A building erected or officially authorized prior to the effective date of the adoption of this edition of the *Code* by the agency or jurisdiction. (SAF-FUN)

3.3.37.6* ***Flexible Plan and Open Plan Educational or Day-Care Building.*** A building or portion of a building designed for multiple teaching stations. (SAF-END)

3.3.37.7* ***High-Rise Building.*** A building where the floor of an occupiable story is greater than 75 ft (23 m) above the lowest level of fire department vehicle access. (SAF-FUN)

3.3.37.8* ***Historic Building.*** A building or facility deemed to have historical, architectural, or cultural significance by a local, regional, or national jurisdiction. (SAF-FUN)

3.3.37.9* ***Special Amusement Building.*** A building or portion thereof that is temporary, permanent, or mobile and contains a ride or device that conveys patrons where the patrons can be contained or restrained, or provides a walkway along, around, or over a course in any direction as a form of amusement or entertainment, and arranged so that the egress path is not readily apparent due to visual or audio distractions, contains an intentionally confounded egress path, or is not readily available due to the mode of conveyance through the building or structure. (SAF-AXM)

3.3.38* Building Code. The building code enforced by the jurisdiction or agency enforcing this *Code.* (SAF-FUN)

3.3.39 Bulk Merchandising Retail Building. See 3.3.37.4.

3.3.40 Business Occupancy. See 3.3.205.3.

N **3.3.41 Carbon Monoxide Detector.** A device that responds to carbon monoxide. [**72,** 2022] (SAF-BSF)

3.3.42 Categories of Rehabilitation Work. The nature and extent of rehabilitation work undertaken in an existing building. (SAF-FUN)

3.3.43* Cellular or Foamed Plastic. A heterogeneous system comprised of not less than two phases, one of which is a continuous, polymeric, organic material, and the second of which is deliberately introduced for the purpose of distributing gas in voids throughout the material. (SAF-INT)

3.3.44 Change of Occupancy Classification. The change in the occupancy classification of a structure or portion of a structure. (SAF-FUN)

3.3.45 Change of Use. A change in the purpose or level of activity within a structure that involves a change in application of the requirements of the *Code.* (SAF-FUN)

3.3.46 Combustible (Material). See 3.3.184.1.

3.3.47 Combustion. A chemical process of oxidation that occurs at a rate fast enough to produce heat and usually light in the form of either a glow or flame. (SAF-FUN)

3.3.48 Common Atmosphere. See 3.3.28.1.

3.3.49* Common Path of Travel. The portion of exit access that must be traversed before two separate and distinct paths of travel to two exits are available. (SAF-MEA)

3.3.50 Compartment.

3.3.50.1* ***Fire Compartment.*** A space within a building that is enclosed by fire barriers on all sides, including the top and bottom. (SAF-FIR)

3.3.50.2* ***Smoke Compartment.*** A space within a building enclosed by smoke barriers on all sides, including the top and bottom. (SAF-FIR)

3.3.51 Contents and Furnishings. Any movable objects in a building or adjacent to a building that normally are secured or otherwise put in place for functional reasons, excluding parts of the internal structure of the building and any items meeting the definition of *interior finish.* (SAF-INT)

3.3.52 Court. An open, uncovered, unoccupied space, unobstructed to the sky, bounded on three or more sides by exterior building walls. (SAF-MEA)

3.3.52.1 ***Enclosed Court.*** A court bounded on all sides by the exterior walls of a building or by the exterior walls and lot lines on which walls are permitted. (SAF-MEA)

3.3.52.2 ***Food Court.*** A public seating area located in a mall concourse that serves adjacent food preparation tenant spaces. (SAF-MER)

3.3.53* Critical Radiant Flux. The level of incident radiant heat energy in units of W/cm^2 on a floor-covering system at the most distant flameout point. (SAF-INT)

N **3.3.54 Damper.**

N **3.3.54.1** ***Combination Fire–Smoke Damper.*** A listed device installed in the ducts or air transfer openings of fire-resistance-rated walls, barriers, partitions, or floors that meets both fire damper and smoke damper requirements. [**90A,** 2024] (SAF-FIR)

N **3.3.54.2*** ***Fire Damper.*** A listed device installed in an air distribution system and designed to close automatically upon detection of heat, to interrupt migratory airflow, and to restrict the passage of flame. [**90A,** 2024] (SAF-FIR)

N **3.3.54.3*** ***Smoke Damper.*** A listed device within an air distribution system to control the movement of smoke. [**90A,** 2024] (SAF-FIR)

3.3.55 Data Conversion. The process of developing the input data set for the assessment method of choice. (SAF-FUN)

3.3.56 Day-Care Home. See 3.3.154.1.

3.3.57 Day-Care Occupancy. See 3.3.205.4.

3.3.58 Deep-Fat Frying. A cooking method that involves fully immersing food in hot oil. (SAF-HEA)

3.3.59 Delayed Action Closer. Mechanical self-closing device that incorporates an adjustable delay prior to the initiation of closing. (SAF-MEA)

3.3.60 Design Fire Scenario. See 3.3.109.1.

3.3.61 Design Specification. See 3.3.282.1.

3.3.62 Design Team. A group of stakeholders including, but not limited to, representatives of the architect, client, and any pertinent engineers and other designers. (SAF-FUN)

3.3.63 Detention and Correctional Occupancy. See 3.3.205.5.

3.3.64 Detention and Correctional Residential Housing Area. See 3.3.24.1.

3.3.65 Device.

3.3.65.1* ***Emergency Stair Travel Device.*** Device designed and constructed to facilitate travel over interior floor surfaces, interior and exterior stairs, and exterior accessible pathways. (SAF-MEA)

Δ **3.3.65.2** ***Multiple-Station Alarm Device.*** Two or more single-station alarm devices that can be interconnected so that actuation of one causes all integral or separate audible alarms to operate; or one single-station alarm device having connections to other detectors or to a manual fire alarm box. (SAF-BSF)

3.3.66 Door.

3.3.66.1 ***Elevator Lobby Door.*** A door between an elevator lobby and another building space other than the elevator shaft. (SAF-MEA)

3.3.66.2 ***Fire Door.*** The door component of a fire door assembly. (SAF-FIR)

3.3.67 Door Assembly. See 3.3.26.1.

3.3.68* Dormitory. A building or a space in a building in which group sleeping accommodations are provided for more than 16 persons who are not members of the same family in one room, or a series of closely associated rooms, under joint occupancy and single management, with or without meals, but without individual cooking facilities. (SAF-RES)

3.3.69 Draftstop. A continuous membrane used to subdivide a concealed space to resist the passage of smoke and heat. (SAF-FIR)

3.3.70* Dwelling Unit. One or more rooms arranged for complete, independent housekeeping purposes with space for eating, living, and sleeping; facilities for cooking; and provisions for sanitation. (SAF-RES)

3.3.70.1* ***One- and Two-Family Dwelling Unit.*** A building that contains not more than two dwelling units, each dwelling unit occupied by members of a single family with not more than three outsiders, if any, accommodated in rented rooms. (SAF-RES)

3.3.70.2 ***One-Family Dwelling Unit.*** A building that consists solely of one dwelling unit with independent cooking and bathroom facilities. (SAF-RES)

3.3.70.3 ***Two-Family Dwelling Unit.*** A building that consists solely of two dwelling units with independent cooking and bathroom facilities. (SAF-RES)

3.3.71 Educational Occupancy. See 3.3.205.6.

3.3.72* Electroluminescent. Refers to a light-emitting capacitor in which alternating current excites phosphor atoms placed between electrically conductive surfaces and produces light. (SAF-MEA)

3.3.73 Elevator Evacuation System. See 3.3.296.1.

3.3.74 Elevator Lobby. A landing from which occupants directly enter an elevator car(s) and into which occupants directly enter upon leaving an elevator car(s). (SAF-MEA)

3.3.75 Elevator Lobby Door. See 3.3.66.1.

3.3.76 Emergency Control Functions. Building, fire, and emergency control elements or systems that are initiated by the fire alarm or signaling system and either increase the level of life safety for occupants or control the spread of the harmful effects of fire or other dangerous products. [**72,** 2022] (SAF-BSF)

3.3.77 Emergency Stair Travel Device. See 3.3.65.1.

3.3.78 Enclosed Court. See 3.3.52.1.

3.3.79 Enclosed Parking Structure. See 3.3.293.8.1, Parking Structure, Enclosed.

3.3.80 Equipment or Fixture. Any plumbing, heating, electrical, ventilating, air-conditioning, refrigerating, and fire protection equipment; and elevators, dumbwaiters, escalators, boilers, pressure vessels, or other mechanical facilities or installations that are related to building services. (SAF-FUN)

3.3.81 Equivalency. An alternative means of providing an equal or greater degree of safety than that afforded by strict conformance to prescribed codes and standards. (SAF-FUN)

3.3.82 Evacuation. The withdrawal of occupants from a building. [**72,** 2022] (SAF-BSF)

3.3.83* Evacuation Capability. The ability of occupants, residents, and staff as a group either to evacuate a building or to relocate from the point of occupancy to a point of safety. (SAF-BCF)

3.3.83.1 ***Impractical Evacuation Capability.*** The inability of a group to reliably move to a point of safety in a timely manner. (SAF-BCF)

3.3.83.2 ***Prompt Evacuation Capability.*** The ability of a group to move reliably to a point of safety in a timely manner that is equivalent to the capacity of a household in the general population. (SAF-BCF)

3.3.83.3 ***Slow Evacuation Capability.*** The ability of a group to move reliably to a point of safety in a timely manner, but not as rapidly as members of a household in the general population. (SAF-BCF)

3.3.84 Exhibit. A space or portable structure used for the display of products or services. (SAF-AXM)

3.3.85 Exhibitor. An individual or entity engaged in the display of the products or services offered. (SAF-AXM)

3.3.86* Existing. That which is already in existence on the date this edition of the *Code* goes into effect. (SAF-FUN)

3.3.86.1 ***Approved Existing.*** That which is already in existence on the date this edition of the *Code* goes into effect and is acceptable to the authority having jurisdiction. (SAF-FUN)

3.3.87 Existing Building. See 3.3.37.5.

3.3.88* Exit. That portion of a means of egress that is separated from all other spaces of the building or structure by construction, location, or equipment as required to provide a protected way of travel to the exit discharge. (SAF-MEA)

3.3.88.1* ***Horizontal Exit.*** A way of passage from one building to an area of refuge in another building on approximately the same level, or a way of passage through or around a fire barrier to an area of refuge on approximately the same level in the same building that affords safety from fire and smoke originating from the area of incidence and areas communicating therewith. (SAF-MEA)

3.3.89 Exit Access. That portion of a means of egress that leads to an exit. (SAF-MEA)

3.3.90 Exit Discharge. That portion of a means of egress between the termination of an exit and a public way. (SAF-MEA)

3.3.90.1* ***Level of Exit Discharge.*** The story that is either (1) the lowest story from which not less than 50 percent of the required number of exits and not less than 50 percent of the required egress capacity from such a story discharge directly outside at the finished ground level; or (2) where no story meets the conditions of item (1), the story that is provided with one or more exits that discharge directly to the outside to the finished ground level via the smallest elevation change. (SAF-MEA)

3.3.91 Exposition. An event in which the display of products or services is organized to bring together the provider and user of the products or services. (SAF-AXM)

3.3.92 Exposition Facility. See 3.3.95.1.

3.3.93* Exposure Fire. A fire that starts at a location that is remote from the area being protected and grows to expose that which is being protected. (SAF-FUN)

3.3.94 Externally Illuminated. See 3.3.158.1.

3.3.95 Facility.

3.3.95.1 ***Exposition Facility.*** A convention center, hotel, or other building at which exposition events are held. (SAF-AXM)

Δ **3.3.95.2*** ***Limited Care Facility.*** A building or portion of a building used on a 24-hour basis for the housing of four or more persons who are incapable of self-preservation because of age; physical disability due to accident or illness; or intellectual disability, mental health condition, or substance abuse disorder. (SAF-HEA)

3.3.96 Festival Seating. See 3.3.257.1.

3.3.97 Finish.

3.3.97.1 ***Interior Ceiling Finish.*** The interior finish of ceilings. (SAF-INT)

3.3.97.2* ***Interior Finish.*** The exposed surfaces of walls, ceilings, and floors within buildings. (SAF-INT)

3.3.97.3* ***Interior Floor Finish.*** The interior finish of floors, ramps, stair treads and risers, and other walking surfaces. (SAF-INT)

3.3.97.4* ***Interior Wall Finish.*** The interior finish of columns, fixed or movable walls, and fixed or movable partitions. (SAF-INT)

3.3.98 Finished Ground Level (Grade). The level of the finished ground (earth or other surface on ground). *(See also 3.3.134, Grade Plane.)* (SAF-FUN)

3.3.99 Fire Barrier. See 3.3.32.1.

3.3.100 Fire Barrier Wall. See 3.3.312.1.

3.3.101* Fire Code. The fire code enforced by the jurisdiction or agency enforcing this *Code*. (SAF-FUN)

3.3.102 Fire Compartment. See 3.3.50.1.

3.3.103 Fire Door. See 3.3.66.2.

3.3.104 Fire Door Assembly. See 3.3.26.1.1.

3.3.105 Fire Exit Hardware. See 3.3.143.1.

3.3.106* Fire Model. A structured approach to predicting one or more effects of a fire. (SAF-FUN)

3.3.107 Fire Protection Rating. See 3.3.240.1.

3.3.108 Fire Resistance Rating. See 3.3.240.2.

3.3.109* Fire Scenario. A set of conditions that defines the development of fire, the spread of combustion products throughout a building or portion of a building, the reactions of people to fire, and the effects of combustion products. (SAF-FUN)

3.3.109.1 ***Design Fire Scenario.*** A fire scenario selected for evaluation of a proposed design. (SAF-FUN)

3.3.110 Fire Watch. The assignment of a person or persons to an area for the express purpose of notifying the fire department, the building occupants, or both of an emergency; preventing a fire from occurring; extinguishing small fires; protecting the public from fire or life safety dangers. [**1,** 2024] (SAF-BSF)

3.3.111 Fire Window Assembly. See 3.3.26.2.

3.3.112 Fire-Rated Glazing. Glazing with either a fire protection rating or a fire resistance rating. (SAF-FIR)

3.3.113 Fire-Retardant-Treated Wood. A wood product impregnated with chemical by a pressure process or other means during manufacture, treated to exhibit reduced surface-burning characteristics and resist propagation of fire. [**703,** 2024] (SAF-FUN)

3.3.114 Fire-Retardant Coating. A coating that reduces the flame spread index of Douglas fir, or of any other tested combustible surface to which it is applied, when tested in accordance with a test for assessing surface burning characteristics. [**703,** 2024] (SAF-INT)

3.3.115 First Story Above Grade Plane. See 3.3.134.1.

3.3.116 Fixed Seating. See 3.3.257.2.

3.3.117* Flame Spread. The propagation of flame over a surface. (SAF-INT)

3.3.118 Flame Spread Index. See 3.3.161.1.

3.3.119 Flaming Droplets. Liquefied material that separates and drips from the test specimen during the fire test and continues to burn with flame. (SAF-INT)

3.3.120 Flashover. A stage in the development of a contained fire in which all exposed surfaces reach ignition temperature more or less simultaneously and fire spreads rapidly throughout the space. (SAF-INT)

3.3.121 Flexible Plan and Open Plan Educational or Day-Care Building. See 3.3.37.6.

3.3.122 Floor Fire Door Assembly. See 3.3.26.1.1.1.

3.3.123 Flow Time. A component of total evacuation time that is the time during which there is crowd flow past a point in the means of egress system. (SAF-AXM)

3.3.124 Fly Gallery. A raised floor area above a stage from which the movement of scenery and operation of other stage effects are controlled. (SAF-AXM)

3.3.125 Foam Plastic Insulation. See 3.3.165.1.

3.3.126 Folding and Telescopic Seating. See 3.3.257.3.

3.3.127 Food Court. See 3.3.52.2.

N **3.3.128* Fuel-Burning Appliance.** A device that burns solid, liquid, or gaseous fuel or a combination thereof. (SAF-FUN)

3.3.129 Fuel Load. See 3.3.177.1.

N **3.3.130 Fully Automated Parking System.** See 3.3.294.1.

3.3.131 General Industrial Occupancy. See 3.3.205.8.1.

3.3.132 Goal. A nonspecific overall outcome to be achieved that is measured on a qualitative basis. (SAF-FUN)

3.3.133 Grade. See 3.3.98, Finished Ground Level (Grade).

3.3.134* Grade Plane. A reference plane upon which vertical measurements of a building are based representing the average of the finished ground level adjoining the building at all exterior walls. (SAF-FUN)

3.3.134.1 ***First Story Above Grade Plane.*** Any story having its finished floor surface entirely above grade plane, except that a basement is to be considered as a first story above grade plane where the finished surface of the floor above the basement is (1) more than 6 ft (1830 mm) above grade plane or (2) more than 12 ft (3660 mm) above the finished ground level at any point. (SAF-FUN)

3.3.135* Grandstand. A structure that provides tiered or stepped seating. (SAF-AXM)

3.3.136 Gridiron. The structural framing over a stage supporting equipment for hanging or flying scenery and other stage effects. (SAF-AXM)

3.3.137 Gross Floor Area. See 3.3.24.2.2.

3.3.138 Gross Leasable Area. See 3.3.24.3.

3.3.139 Guard. A vertical protective barrier erected along exposed edges of stairways, balconies, and similar areas. (SAF-MEA)

3.3.140 Guest Room. An accommodation combining living, sleeping, sanitary, and storage facilities within a compartment. (SAF-RES)

3.3.141 Guest Suite. See 3.3.295.1.

3.3.142 Handrail. A bar, pipe, or similar member designed to furnish persons with a handhold. (SAF-MEA)

3.3.143 Hardware.

3.3.143.1 ***Fire Exit Hardware.*** A type of panic hardware that additionally provides fire protection where used as part of a fire door assembly. (SAF-MEA)

3.3.143.2 ***Panic Hardware.*** A door-latching assembly incorporating an actuating member or bar that releases the latch bolt upon the application of a force in the direction of egress travel. (SAF-MEA)

3.3.144 Hazard Material. See 3.3.184.2.

3.3.145 Hazardous Area. See 3.3.24.4.

3.3.146 Hazardous Material. See 3.3.184.3.

3.3.147 Health Care Occupancy. See 3.3.205.7.

3.3.148 Health Hazard Material. See 3.3.184.2.1.

3.3.149* Heat Release Rate (HRR). The rate at which heat energy is generated by burning. [**921,** 2021] (SAF-INT)

3.3.150 High Hazard Industrial Occupancy. See 3.3.205.8.2.

3.3.151 Highly Toxic Material. See 3.3.184.7.1.

3.3.152 High-Rise Building. See 3.3.37.7.

3.3.153 Historic Building. See 3.3.37.8.

3.3.154 Home.

3.3.154.1* ***Day-Care Home.*** A building or portion of a building in which more than 3 but not more than 12 clients receive care, maintenance, and supervision, by other than their relative(s) or legal guardians(s), for less than 24 hours per day. (SAF-END)

3.3.154.2 ***Nursing Home.*** A building or portion of a building used on a 24-hour basis for the housing and nursing care of four or more persons who, because of mental or physical incapacity, might be unable to provide for their

own needs and safety without the assistance of another person. (SAF-HEA)

3.3.155 Horizontal Exit. See 3.3.88.1.

3.3.156 Hospital. A building or portion thereof used on a 24-hour basis for the medical, psychiatric, obstetrical, or surgical care of four or more inpatients. (SAF-HEA)

3.3.157* Hotel. A building or groups of buildings under the same management in which there are sleeping accommodations for more than 16 persons and primarily used by transients for lodging with or without meals. (SAF-RES)

3.3.158 Illuminated.

3.3.158.1* *Externally Illuminated.* Refers to an illumination source that is contained outside of the device or sign legend area that is to be illuminated. (SAF-MEA)

3.3.158.2* *Internally Illuminated.* Refers to an illumination source that is contained inside the device or legend that is illuminated. (SAF-MEA)

3.3.159 Impractical Evacuation Capability. See 3.3.83.1.

3.3.160 Incapacitation. A condition under which humans do not function adequately and become unable to escape untenable conditions. (SAF-FUN)

3.3.161 Index.

3.3.161.1 *Flame Spread Index.* A comparative measure, expressed as a dimensionless number, derived from visual measurements of the spread of flame versus time for a material tested in accordance with ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, or UL 723, *Test for Surface Burning Characteristics of Building Materials*. (SAF-INT)

3.3.161.2 *Smoke Developed Index.* A comparative measure, expressed as a dimensionless number, derived from measurements of smoke obscuration versus time for a material tested in accordance with ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, or UL 723, *Test for Surface Burning Characteristics of Building Materials*. (SAF-INT)

3.3.162 Industrial Occupancy. See 3.3.205.8.

N **3.3.163 Inflatable Amusement Device.** A device made of a flexible fabric, potentially with supports or anchors, inflated by one or more blowers, relying upon air pressure to maintain its shape and designed for patron activities that include, but are not limited to, bouncing, climbing, sliding, obstacle course running, and interactive play. (SAF-INT)

3.3.164 Input Data Specification. See 3.3.282.2.

3.3.165 Insulation.

3.3.165.1 *Foam Plastic Insulation.* A cellular plastic, used for thermal insulating or acoustical applications, having a density of 20 lb/ft^3 (320 kg/m^3) or less, containing open or closed cells, and formed by a foaming agent. (SAF-INT)

3.3.165.2 *Reflective Insulation.* Thermal insulation consisting of one or more low-emittance surfaces bounding one or more enclosed air spaces. (SAF-INT)

3.3.166 Interior Ceiling Finish. See 3.3.97.1.

3.3.167 Interior Finish. See 3.3.97.2.

3.3.168 Interior Floor Finish. See 3.3.97.3.

3.3.169 Interior Wall Finish. See 3.3.97.4.

3.3.170 Internally Illuminated. See 3.3.158.2.

3.3.171 Joint. A linear opening in or between adjacent assemblies that is designed to allow independent movement of the building. (SAF-FIR)

3.3.172 Level of Exit Discharge. See 3.3.90.1.

3.3.173 Life Safety Evaluation. A written review dealing with the adequacy of life safety features relative to fire, storm, collapse, crowd behavior, and other related safety considerations. (SAF-AXM)

3.3.174 Limited Access Structure. See 3.3.293.3.

3.3.175 Limited Care Facility. See 3.3.95.2.

3.3.176 Living Area. See 3.3.24.5.

3.3.177 Load.

3.3.177.1* *Fuel Load.* The total quantity of combustible contents of a building, space, or fire area. (SAF-FUN)

3.3.177.2 *Occupant Load.* The total number of persons that might occupy a building or portion thereof at any one time. (SAF-MEA)

3.3.178 Load-Bearing Element. Any column, girder, beam, joist, truss, rafter, wall, floor, or roof sheathing that supports any vertical load in addition to its own weight, or any lateral load. (SAF-FIR)

3.3.179 Lock-Up. An incidental use area in other than a detention and correctional occupancy where occupants are restrained and such occupants are mostly incapable of self-preservation because of security measures not under the occupants' control. (SAF-DET)

3.3.180 Lodging or Rooming House. A building or portion thereof that does not qualify as a one- or two-family dwelling, that provides sleeping accommodations for a total of 16 or fewer people on a transient or permanent basis, without personal care services, with or without meals, but without separate cooking facilities for individual occupants. (SAF-RES)

3.3.181 Major Tenant. A tenant space, in a mall structure, with one or more main entrances from the exterior that also serve as exits and are independent of the mall concourse. (SAF-MER)

3.3.182 Mall Concourse. A common pedestrian area within a mall structure that serves as access for two or more tenants and does not exceed three levels that are open to each other. (SAF-MER)

3.3.182.1* *Open Mall Concourse.* A mall concourse that either (1) has 50 percent or more of the total area of the solid mall concourse perimeter walls and solid roof area open to the atmosphere with openings distributed uniformly over the length of the mall concourse, or (2) has an approved open mall concourse engineering analysis. (SAF-MER)

3.3.182.2 ***Enclosed Mall Concourse.*** A mall concourse that does not meet the definition of open mall concourse. (SAF-MER)

3.3.183 Mall Structure. See 3.3.293.4.

3.3.184 Material.

3.3.184.1 ***Combustible (Material).*** A material that, in the form in which it is used and under the conditions anticipated, will ignite and burn; a material that does not meet the definition of noncombustible or limited-combustible. (SAF-FUN)

3.3.184.2 ***Hazard Material.***

Δ **3.3.184.2.1** ***Health Hazard Material.*** A chemical or substance classified as a toxic, highly toxic, or corrosive material in accordance with definitions set forth in this code. [**400,** 2022] (SAF-IND)

3.3.184.2.2 ***Physical Hazard Material.*** A chemical or substance classified as an explosive, flammable cryogen, flammable gas, flammable solid, ignitible (flammable or combustible) liquid, organic peroxide, oxidizer, oxidizing cryogen, pyrophoric, unstable (reactive), or water-reactive material. [**400,** 2022] (SAF-IND)

3.3.184.3 ***Hazardous Material.*** A chemical or substance that is classified as a physical hazard material or a health hazard material, whether the chemical or substance is in usable or waste condition. [**400,** 2022] (SAF-IND)

3.3.184.4 ***Limited-Combustible (Material).*** See 4.6.14.

3.3.184.5 ***Metal Composite Material (MCM).*** A factory-manufactured panel consisting of metal skins bonded to both faces of a core made of any plastic other than foamed plastic insulation as defined in 3.3.165.1. (SAF-MER)

3.3.184.6 ***Noncombustible (Material).*** See 4.6.13.

Δ **3.3.184.7** ***Toxic Material.*** A material that produces a lethal dose or a lethal concentration within any of the following categories: (1) a chemical or substance that has a median lethal dose (LD_{50}) of more than 50 mg/kg but not more than 500 mg/kg of body weight when administered orally to albino rats weighing between 200 g and 300 g each; (2) a chemical or substance that has a median lethal dose (LD_{50}) of more than 200 mg/kg but not more than 1000 mg/kg of body weight when administered by continuous contact for 24 hours, or less if death occurs within 24 hours, with the bare skin of albino rabbits weighing between 2 kg and 3 kg each, or albino rats weighing 200 g to 300 g each; (3) a chemical or substance that has a median lethal concentration (LC_{50}) in air of more than 200 parts per million but not more than 2000 parts per million by volume of gas or vapor, or more than 2 mg/L but not more than 20 mg/L, of mist, fume, or dust when administered by continuous inhalation for 1 hour, or less if death occurs within 1 hour, to albino rats weighing between 200 g and 300 g each. [**400,** 2022] (SAF-IND)

3.3.184.7.1 ***Highly Toxic Material.*** A material that produces a lethal dose or lethal concentration that falls within any of the following categories: (1) a chemical that has a median lethal dose (LD_{50}) of 50 mg/kg or less of body weight when administered orally to albino rats weighing between 200 g and 300 g each; (2) a chemical that has a median lethal dose (LD_{50}) of 200 mg/kg or less of body weight when administered by continuous contact for 24 hours, or less if death occurs within 24 hours, with the bare skin of albino rabbits weighing between 2 kg and 3 kg each or albino rats weighing 200 g to 300 g each; (3) a chemical that has a median lethal concentration (LC_{50}) in air of 200 parts per million by volume or less of gas or vapor, or 2 mg/L or less of mist, fume, or dust, when administered by continuous inhalation for 1 hour, or less if death occurs within 1 hour, to albino rats weighing between 200 g and 300 g each. [**400,** 2022] (SAF-IND)

3.3.184.8 ***Weathered-Membrane Material.*** Membrane material that has been subjected to a minimum of 3000 hours in a weatherometer in accordance with ASTM G155, *Standard Practice for Operating Xenon Arc Lamp Apparatus for Exposure of Materials*, or approved equivalent. (SAF-IND)

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

3.3.185.1 ***Accessible Means of Egress.*** A means of egress that provides an accessible route to an area of refuge, a horizontal exit, or a public way. (SAF-MEA)

3.3.186 Means of Escape. A way out of a building or structure that does not conform to the strict definition of means of egress but does provide an alternate way out. (SAF-MEA)

N **3.3.187 Mechanical Parking System.** See 3.3.294.2.

3.3.188* Membrane. A thin layer of construction material. (SAF-FIR)

3.3.189 Membrane Structure. See 3.3.293.5.

3.3.190 Mercantile Occupancy. See 3.3.205.9.

3.3.191 Metal Composite Material (MCM). See 3.3.184.5.

3.3.192 Mezzanine. An intermediate level between the floor and the ceiling of any room or space. (SAF-FIR)

3.3.193 Mixed Occupancy. See 3.3.205.10.

3.3.194* Modification. The reconfiguration of any space; the addition or elimination of any door or window; the addition or elimination of load-bearing elements; the reconfiguration or extension of any system; or the installation of any additional equipment. (SAF-FUN)

N **3.3.195 Modular Room.** An occupiable, prefabricated structure consisting of walls and a ceiling, with or without an integrated floor, that might include integral electrical wiring, ventilation, and furnishings. (SAF-FUN)

3.3.196 Multilevel Play Structure. See 3.3.293.6.

3.3.197 Multiple Occupancy. See 3.3.205.11.

3.3.198 Multiple-Station Alarm Device. See 3.3.65.2.

3.3.199 Multipurpose Assembly Occupancy. See 3.3.205.2.1.

3.3.200 Net Floor Area. See 3.3.24.2.4.

3.3.201 Non-Patient-Care Suite (Health Care Occupancies). See 3.3.295.3.

3.3.202 Normally Unoccupied Building Service Equipment Support Area. See 3.3.24.6.

3.3.203 Nursing Home. See 3.3.154.2.

3.3.204* Objective. A requirement that needs to be met to achieve a goal. (SAF-FUN)

3.3.205 Occupancy. The purpose for which a building or other structure, or part thereof, is used or intended to be used. [**ASCE/SEI 7:**1.2] (SAF-FUN)

3.3.205.1* ***Ambulatory Health Care Occupancy.*** An occupancy used to provide services or treatment simultaneously to four or more patients that provides, on an outpatient basis, one or more of the following: (1) treatment for patients that renders the patients incapable of taking action for self-preservation under emergency conditions without the assistance of others; (2) anesthesia that renders the patients incapable of taking action for self-preservation under emergency conditions without the assistance of others; (3) treatment for patients who, due to the nature of their injury or illness, are incapable of taking action for self-preservation under emergency conditions without the assistance of others. (SAF-HEA)

3.3.205.2* ***Assembly Occupancy.*** An occupancy (1) used for a gathering of 50 or more persons for deliberation, worship, entertainment, eating, drinking, amusement, awaiting transportation, or similar uses; or (2) used as a special amusement building, regardless of occupant load. (SAF-AXM)

3.3.205.2.1 ***Multipurpose Assembly Occupancy.*** An assembly room designed to accommodate temporarily any of several possible assembly uses. (SAF-AXM)

3.3.205.3* ***Business Occupancy.*** An occupancy used for the transaction of business other than mercantile. (SAF-MER)

3.3.205.4* ***Day-Care Occupancy.*** An occupancy in which four or more clients receive care, maintenance, and supervision, by other than their relatives or legal guardians, for less than 24 hours per day. (SAF-END)

3.3.205.5* ***Detention and Correctional Occupancy.*** An occupancy, other than one whose primary intended use is health care, ambulatory health care, or residential board and care, used to lawfully incarcerate or lawfully detain one or more persons under varied degrees of restraint or security where such occupants are mostly incapable of self-preservation because of security measures not under the occupants' control. (SAF-DET)

3.3.205.6* ***Educational Occupancy.*** An occupancy used for educational purposes through the twelfth grade by six or more persons for 4 or more hours per day or more than 12 hours per week. (SAF-END)

3.3.205.7* ***Health Care Occupancy.*** An occupancy used to provide medical or other treatment or care simultaneously to four or more patients on an inpatient basis, where such patients are mostly incapable of self-preservation due to age, physical or mental disability, or because of security measures not under the occupants' control. (SAF-HEA)

3.3.205.8* ***Industrial Occupancy.*** An occupancy in which products are manufactured or in which processing, assembling, mixing, packaging, finishing, decorating, or repair operations are conducted. (SAF-IND)

3.3.205.8.1* ***General Industrial Occupancy.*** An industrial occupancy in which ordinary and low hazard industrial operations are conducted in buildings of conventional design suitable for various types of industrial processes. (SAF-IND)

3.3.205.8.2* ***High Hazard Industrial Occupancy.*** An industrial occupancy in which industrial operations that include high hazard materials, processes, or contents are conducted. (SAF-IND)

3.3.205.8.3 ***Special-Purpose Industrial Occupancy.*** An industrial occupancy in which ordinary and low hazard industrial operations are conducted in buildings designed for, and suitable only for, particular types of operations, characterized by a relatively low density of employee population, with much of the area occupied by machinery or equipment. (SAF-IND)

3.3.205.9* ***Mercantile Occupancy.*** An occupancy used for the display and sale of merchandise. (SAF-MER)

3.3.205.10 ***Mixed Occupancy.*** A multiple occupancy where the occupancies are intermingled. (SAF-FUN)

3.3.205.11 ***Multiple Occupancy.*** A building or structure in which two or more classes of occupancy exist. (SAF-FUN)

3.3.205.12* ***Residential Board and Care Occupancy.*** An occupancy used for lodging and boarding of four or more residents, not related by blood or marriage to the owners or operators, for the purpose of providing personal care services. (SAF-BCF)

3.3.205.13* ***Residential Occupancy.*** An occupancy that provides sleeping accommodations for purposes other than health care or detention and correctional. (SAF-RES)

3.3.205.14 ***Separated Occupancy.*** A multiple occupancy where the occupancies are separated by fire resistance–rated assemblies. (SAF-FUN)

3.3.205.15* ***Storage Occupancy.*** An occupancy used primarily for the storage or sheltering of goods, merchandise, products, or vehicles. (SAF-IND)

3.3.206 Occupant Characteristics. The abilities or behaviors of people before and during a fire. (SAF-FUN)

3.3.207 Occupant Load. See 3.3.177.2.

3.3.208 Occupiable Area. See 3.3.24.7.

3.3.209 Occupiable Story. See 3.3.290.1.

3.3.210 One- and Two-Family Dwelling Unit. See 3.3.70.1.

3.3.211 One-Family Dwelling Unit. See 3.3.70.2.

3.3.212 Open Parking Structure. See 3.3.293.8.2, Parking Structure, Open.

3.3.213 Open Structure. See 3.3.293.7.

3.3.214 Open-Air Mercantile Operation. An operation conducted outside of all structures, with the operations area devoid of all walls and roofs except for small, individual, weather canopies. (SAF-MER)

3.3.215 Outside Stair. See 3.3.286.2.

3.3.216 Panic Hardware. See 3.3.143.2.

3.3.217 Parking Structure. See 3.3.293.8.

3.3.218 Patient Care Non-Sleeping Suite (Health Care Occupancies). See 3.3.295.4.

3.3.219 Patient Care Sleeping Suite (Health Care Occupancies). See 3.3.295.5.

3.3.220 Patient Care Suite (Health Care Occupancies). See 3.3.295.2, Health Care Suite (Health Care Occupancies).

3.3.221* Performance Criteria. Threshold values on measurement scales that are based on quantified performance objectives. (SAF-FUN)

3.3.222 Permanent Structure. See 3.3.293.9.

3.3.223* Personal Care. The care of residents who do not require chronic, convalescent medical or continuous skilled nursing care. (SAF-BCF)

3.3.224* Photoluminescent. Having the ability to store incident electromagnetic radiation typically from ambient light sources, and release it in the form of visible light. [**301,** 2023] (SAF-MEA)

3.3.225 Physical Hazard Material. See 3.3.184.2.2.

3.3.226 Pinrail. A rail on or above a stage through which belaying pins are inserted and to which lines are fastened. (SAF-AXM)

3.3.227* Platform. The raised area within a building used for the presentation of music, plays, or other entertainment. (SAF-AXM)

3.3.227.1 ***Temporary Platform.*** A platform erected within an area for not more than 30 days. (SAF-AXM)

3.3.228 Plenum. A compartment or chamber to which one or more air ducts are connected and that forms part of the air-distribution system. (SAF-FIR)

3.3.229 Point of Safety. A location that (a) is exterior to and away from a building; or (b) is within a building of any construction type protected throughout by an approved automatic sprinkler system and that is either (1) within an exit enclosure meeting the requirements of this *Code,* or (2) within another portion of the building that is separated by smoke barriers in accordance with Section 8.5 having a minimum ½-hour fire resistance rating, and that portion of the building has access to a means of escape or exit that conforms to the requirements of this *Code* and does not necessitate return to the area of fire involvement; or (c) is within a building of Type I, Type II (222), Type II (111), Type III (211), Type IV, or Type V (111) construction *(see 8.2.1.2)* and is either (1) within an exit enclosure meeting the requirements of this *Code*, or (2) within another portion of the building that is separated by smoke barriers in accordance with Section 8.5 having a minimum ½-hour fire resistance rating, and that portion of the building has access to a means of escape or exit that conforms to the requirements of this *Code* and does not necessitate return to the area of fire involvement. (SAF-BCF)

3.3.230 Previously Approved. That which was acceptable to the authority having jurisdiction prior to the date this edition of the *Code* went into effect. (SAF-FUN)

3.3.231 Power Doors.

3.3.231.1* ***Low-Energy Power-Operated Door.*** Swinging, sliding, or folding door that opens automatically upon an action by a pedestrian, closes automatically, and operates with decreased forces and decreased speeds.

3.3.231.2* ***Power-Assisted Door.*** Swinging door that opens by reduced pushing or pulling force on the door operating hardware, closes automatically after the pushing or pulling force is released, and functions with decreased forces.

3.3.231.3 ***Power-Operated Door.*** Swinging, sliding, or folding door that opens automatically when approached by a pedestrian or opens automatically upon an action by a pedestrian, closes automatically, and includes provisions to prevent entrapment.

3.3.232 Private Party Tent. See 3.3.301.1. (SAF-AXM)

3.3.233 Professional Engineer. A person registered or licensed to practice engineering in a jurisdiction, subject to all laws and limitations imposed by the jurisdiction. (SAF-FUN)

3.3.234 Prompt Evacuation Capability. See 3.3.83.2. (SAF-BCF)

3.3.235* Proposed Design. A design developed by a design team and submitted to the authority having jurisdiction for approval. (SAF-FUN)

3.3.236 Proscenium Wall. See 3.3.312.2.

3.3.237* Public Way. A street, alley, or other similar parcel of land essentially open to the outside air deeded, dedicated, or otherwise permanently appropriated to the public for public use and having a clear width and height of not less than 10 ft (3050 mm). (SAF-MEA)

3.3.238* Ramp. A walking surface that has a slope steeper than 1 in 20. (SAF-MEA)

3.3.238.1 ***Aisle Ramp.*** A ramp within a seating area of an assembly occupancy that directly serves rows of seating to the side of the ramp. (SAF-AXM)

3.3.239 Ramp Type Parking Structure. See 3.3.293.8.3, Parking Structure, Ramp Type.

3.3.240 Rating.

3.3.240.1* ***Fire Protection Rating.*** The designation indicating the duration of the fire test exposure to which an opening protective assembly was exposed. [**221,** 2024] (SAF-FIR)

3.3.240.2 ***Fire Resistance Rating.*** The time, in minutes or hours, that materials or assemblies have withstood a fire exposure as determined by the tests, or methods based on tests, prescribed by this *Code.* (SAF-FIR)

3.3.241* Reconstruction. The reconfiguration of a space that affects an exit or a corridor shared by more than one occupant space; or the reconfiguration of a space such that the rehabilitation work area is not permitted to be occupied because existing means of egress and fire protection systems, or their equivalent, are not in place or continuously maintained. (SAF-FUN)

3.3.242 Reflective Insulation. See 3.3.165.2.

3.3.243 Registered Architect. A person licensed to practice architecture in a jurisdiction, subject to all laws and limitations imposed by the jurisdiction. (SAF-FUN)

3.3.244 Registered Design Professional (RDP). An individual who is registered or licensed to practice his/her respective design profession as defined by the statutory requirements of the professional registration laws of the state or jurisdiction in which the project is to be constructed. (SAF-FUN)

3.3.245 Regular Stage. See 3.3.285.2.

3.3.246 Rehabilitation Work Area. See 3.3.24.8

3.3.247 Relocation. The movement of occupants to a safer area within the same building. (SAF-FUN)

3.3.248 Renovation. The replacement-in kind, strengthening, or upgrading of building elements, materials, equipment, or fixtures that does not result in a reconfiguration of the building spaces within. (SAF-FUN)

3.3.249 Repair. The patching, restoration, or painting of materials, elements, equipment, or fixtures for the purpose of maintaining such materials, elements, equipment, or fixtures in good or sound condition. (SAF-FUN)

3.3.250 Residential Board and Care Occupancy. See 3.3.205.12.

3.3.251 Residential Board and Care Resident. A person who receives personal care and resides in a residential board and care facility. (SAF-BCF)

3.3.252 Residential Occupancy. See 3.3.205.13.

3.3.253 Safe Location. A location remote or separated from the effects of a fire so that such effects no longer pose a threat. (SAF-FUN)

3.3.254 Safety Factor. A factor applied to a predicted value to ensure that a sufficient safety margin is maintained. (SAF-FUN)

3.3.255 Safety Margin. The difference between a predicted value and the actual value where a fault condition is expected. (SAF-FUN)

3.3.256 Sally Port (Security Vestibule). A compartment provided with two or more doors where the intended purpose is to prevent continuous and unobstructed passage by allowing the release of only one door at a time. (SAF-DET)

3.3.257 Seating.

3.3.257.1* *Festival Seating.* A form of audience/spectator accommodation in which no seating, other than a floor or finished ground level, is provided for the audience/spectators gathered to observe a performance. (SAF-AXM)

3.3.257.2 *Fixed Seating.* Seating that is secured to the building structure. (SAF-AXM)

3.3.257.3 *Folding and Telescopic Seating.* A structure that is used for tiered seating of persons and whose overall shape and size can be reduced, without being dismantled, for purposes of moving or storing. (SAF-AXM)

3.3.257.4 *Smoke-Protected Assembly Seating.* Seating served by means of egress that is not subject to smoke accumulation within or under the structure. (SAF-AXM)

3.3.258 Self-Closing. Equipped with an approved device that ensures closing after opening. (SAF-MEA)

3.3.259* Self-Luminous. Illuminated by a self-contained power source and operated independently of external power sources. (SAF-MEA)

3.3.260 Self-Preservation Capability (Health Care and Ambulatory Health Care Occupancies). The ability of a patient to act on an innate desire to protect oneself from harm without staff intervention. (SAF-HEA)

3.3.261* Self-Preservation (Day-Care Occupancy). The ability of a client to evacuate a day-care occupancy without direct intervention by a staff member. (SAF-END)

3.3.262 Sensitivity Analysis. See 3.3.19.1.

3.3.263 Separate Atmosphere. See 3.3.28.2.

3.3.264 Separated Occupancy. See 3.3.205.14.

3.3.265 Severe Mobility Impairment. The ability to move to stairs but without the ability to use the stairs. (SAF-MEA)

3.3.266 Single-Station Alarm. See 3.3.14.3.

3.3.267 Site-Fabricated Stretch System. See 3.3.296.2.

3.3.268* Situation Awareness. The perception of the elements in the environment within a volume of time and space, the comprehension of their meaning, and the projection of their status in the near future. (SAF-FUN)

N **3.3.269 Sleep Pod.** An occupiable, prefabricated structure that might include integral electrical wiring, ventilation, and furnishings, and that is designed and used for sleeping purposes. (SAF-FUN)

3.3.270 Slow Evacuation Capability. See 3.3.83.3.

3.3.271 Smoke Alarm. See 3.3.14.4.

3.3.272 Smoke Barrier. See 3.3.32.2.

3.3.273 Smoke Compartment. See 3.3.50.2.

3.3.274 Smoke Detector. A device that detects visible or invisible particles of combustion. [**72,** 2022] (SAF-BSF)

3.3.275 Smoke Developed Index. See 3.3.161.2.

3.3.276* Smoke Partition. A continuous membrane that is designed to form a barrier to limit the transfer of smoke. (SAF-FIR)

3.3.277* Smokeproof Enclosure. An enclosure designed to limit the movement of products of combustion produced by a fire. (SAF-MEA)

3.3.278 Smoke-Protected Assembly Seating. See 3.3.257.4.

3.3.279 Special Amusement Building. See 3.3.37.9.

3.3.280 Special Inspection. Services provided by a qualified person, retained by the owner and approved by the authority having jurisdiction, who observes the installation and witnesses the pretesting and operation of the system or systems. (SAF-BSF)

3.3.281 Special-Purpose Industrial Occupancy. See 3.3.205.8.3.

3.3.282 Specification.

3.3.282.1* ***Design Specification.*** A building characteristic and other conditions that are under the control of the design team. (SAF-FUN)

3.3.282.2 ***Input Data Specification.*** Information required by the verification method. (SAF-FUN)

N **3.3.283 Sprinkler System.**

N **3.3.283.1** ***Automatic Sprinkler.*** A fire suppression or control device that operates automatically when its heat-activated element is heated to its thermal rating or above, allowing to discharge over a specified area. [**13,** 2022] (SAF-BSF)

N **3.3.283.2** ***Sprinkler System (NFPA 13/13R).*** A system, commonly activated by heat from a fire and discharges water over the fire area, that consists of an integrated network of piping designed in accordance with fire protection engineering standards that includes a water supply source, a control valve, a waterflow alarm, and a drain. The portion of the sprinkler system above ground is a network of specifically sized or hydraulically designed piping installed in a building, structure, or area, generally overhead, and to which sprinklers are attached in a systematic pattern. [**13,** 2022] (SAF-BSF)

N **3.3.283.3** ***Sprinkler System (NFPA 13D).*** A system that consists of an integrated network of piping designed in accordance with fire protection engineering standards that includes a water supply source, a water control valve, and a drain. The portion of the sprinkler system above ground is a network of specifically sized or hydraulically designed piping installed in a building, structure, or area, generally overhead, and to which sprinklers are attached in a systematic pattern. The system is commonly activated by heat from a fire and discharges water over the fire area. [**13D,** 2022] (SAF-BSF)

3.3.284 Staff (Residential Board and Care). Persons who provide personal care services, supervision, or assistance. (SAF-BCF)

3.3.285 Stage. A space within a building used for entertainment and utilizing drops or scenery or other stage effects. (SAF-AXM)

3.3.285.1 ***Legitimate Stage.*** A stage with a height greater than 50 ft (15 m) measured from the lowest point on the stage floor to the highest point of the roof or floor deck above. (SAF-AXM)

3.3.285.2 ***Regular Stage.*** A stage with a height of 50 ft (15 m) or less measured from the lowest point on the stage floor to the highest point of the roof or floor deck above. (SAF-AXM)

3.3.286* Stair.

3.3.286.1 ***Aisle Stair.*** A stair within a seating area of an assembly occupancy that directly serves rows of seats to the side of the stair, including transition stairs that connect to an aisle or a landing. (SAF-AXM)

3.3.286.2 ***Outside Stair.*** A stair with not less than one side open to the outer air. (SAF-MEA)

3.3.287 Stakeholder. An individual, or representative of same, having an interest in the successful completion of a project. (SAF-FUN)

3.3.288 Storage Occupancy. See 3.3.205.15.

3.3.289* Stories in Height. The story count starting with the level of exit discharge and ending with the highest occupiable story containing the occupancy considered. (SAF-FUN)

3.3.290* Story. The portion of a building located between the upper surface of a floor and the upper surface of the floor or roof next above. (SAF-FUN)

3.3.290.1 ***Occupiable Story.*** A story occupied by people on a regular basis. (SAF-FUN)

3.3.291 Street. A public thoroughfare that has been dedicated for vehicular use by the public and can be used for access by fire department vehicles. (SAF-MEA)

3.3.292* Street Floor. A story or floor level accessible from the street or from outside the building at the finished ground level, with the floor level at the main entrance located not more than three risers above or below the finished ground level, and arranged and utilized to qualify as the main floor. (SAF-MER)

3.3.293* Structure. That which is built or constructed. (SAF-FUN)

3.3.293.1 ***Air-Inflated Structure.*** A structure whose shape is maintained by air pressure in cells or tubes forming all or part of the enclosure of the usable area and in which the occupants are not within the pressurized area used to support the structure. (SAF-IND)

3.3.293.2* ***Air-Supported Structure.*** A structure where shape is maintained by air pressure and in which occupants are within the elevated pressure area. (SAF-IND)

3.3.293.3 ***Limited Access Structure.*** A structure or portion of a structure lacking emergency openings. (SAF-IND)

3.3.293.4* ***Mall Structure.*** A single structure enclosing a number of tenants and occupancies wherein two or more tenants or tenant buildings have a main entrance into one or more mall concourses. For the purpose of this *Code*, anchor buildings shall not be considered as a part of the mall structure. (SAF-MER)

3.3.293.5 ***Membrane Structure.*** A building or portion of a building incorporating an air-inflated, air-supported, tensioned-membrane structure; a membrane roof; or a membrane-covered rigid frame to protect habitable or usable space. (SAF-IND)

3.3.293.6 ***Multilevel Play Structure.*** A structure that consists of tubes, slides, crawling areas, and jumping areas that is located within a building and is used for climbing and entertainment, generally by children. (SAF-AXM)

3.3.293.7* ***Open Structure.*** A structure that supports equipment and operations not enclosed within building walls. (SAF-IND)

3.3.293.8* ***Parking Structure.*** A building, structure, or portion thereof used for the parking, storage, or both, of motor vehicles. [**88A,** 2023] (SAF-IND)

3.3.293.8.1 ***Parking Structure, Enclosed.*** Any parking structure that is not an open parking structure. [**88A,** 2023] (SAF-IND)

3.3.293.8.2 ***Parking Structure, Open.*** A parking structure that meets the requirements of 42.8.1.3. [**88A,** 2023] (SAF-IND)

3.3.293.8.3 ***Parking Structure, Ramp Type.*** A parking structure that utilizes sloped floors for vertical vehicle circulation. [**88A,** 2023] (SAF-IND)

3.3.293.9 ***Permanent Structure.*** A building or structure that is intended to remain in place for a period of more than 180 days in any consecutive 12-month period. (SAF-FUN)

3.3.293.10 ***Temporary Structure.*** A building or structure not meeting the definition of *permanent structure. (See also 3.3.293.9, Permanent Structure.)* (SAF-FUN)

3.3.293.11 ***Tensioned-Membrane Structure.*** A membrane structure incorporating a membrane and a structural support system such as arches, columns and cables, or beams wherein the stresses developed in the tensioned membrane interact with those in the structural support so that the entire assembly acts together to resist the applied loads. (SAF-IND)

3.3.293.12* ***Underground Structure.*** A structure or portions of a structure in which the floor level is located more than 30 ft (9.1 m) below the lowest level with an exit discharge. (SAF-IND)

3.3.293.13 ***Water-Surrounded Structure.*** A structure fully surrounded by water. (SAF-IND)

N **3.3.294 Parking Systems.**

N **3.3.294.1** ***Fully Automated Parking System.*** An unoccupied, vehicle storage and retrieval system that transports vehicles in X (i.e., horizontal right to left), Y (i.e., forward and backward), and Z (i.e., up and down) directions. [**88A,** 2023] (SAF-IND)

N **3.3.294.2** ***Mechanical Parking System.*** A parking system that stores and retrieves vehicles on a platform, and that transports vehicles horizontally and vertically to an available parking location within the parking system. [**88A,** 2023] (SAF-IND)

3.3.295 Suite.

3.3.295.1 ***Guest Suite.*** An accommodation with two or more contiguous rooms comprising a compartment, with or without doors between such rooms, that provides living, sleeping, sanitary, and storage facilities. (SAF-RES)

3.3.295.2 ***Health Care Suite (Health Care Occupancies).*** A room or rooms sharing a means of egress separated from the remainder of the building by walls, doors, floors, and ceilings. (SAF-HEA)

3.3.295.3 ***Non-Patient-Care Suite (Heath Care Occupancies).*** A health care suite that is not intended for patient sleeping or care. (SAF-HEA)

3.3.295.4 ***Patient Care Non-Sleeping Suite (Health Care Occupancies).*** A health care suite providing care for one or more patients not intended for overnight patient sleeping. (SAF-HEA)

3.3.295.5 ***Patient Care Sleeping Suite (Health Care Occupancies).*** A health care suite containing one or more beds intended for overnight patient sleeping. (SAF-HEA)

3.3.296 System.

3.3.296.1 ***Elevator Evacuation System.*** A system, including a vertical series of elevator lobbies and associated elevator lobby doors, an elevator shaft(s), and a machine room(s), that provides protection from fire effects for elevator passengers, people waiting to use elevators, and elevator equipment so that elevators can be used safely for egress. (SAF-MEA)

3.3.296.2 ***Site-Fabricated Stretch System.*** A system, fabricated on-site, and intended for acoustical, tackable, or aesthetic purposes, that is comprised of three elements: (1) a frame (constructed of plastic, wood, metal, or other material) used to hold fabric in place, (2) a core material (infill, with the correct properties for the application), and (3) an outside layer, comprised of a textile, fabric, or vinyl, that is stretched taut and held in place by tension or mechanical fasteners via the frame. (SAF-INT)

3.3.297 Technically Infeasible. A change to a building that has little likelihood of being accomplished because the existing structural conditions require the removal or alteration of a load-bearing member that is an essential part of the structural frame, or because other existing physical or site constraints prohibit modification or addition of elements, spaces, or features that are in full and strict compliance with applicable requirements. (SAF-FUN)

3.3.298 Temporary Platform. See 3.3.227.1.

3.3.299 Temporary Structure. See 3.3.293.10.

3.3.300 Tensioned-Membrane Structure. See 3.3.293.11.

3.3.301* Tent. A temporary structure, the covering of which is made of pliable material that achieves its support by mechanical means such as beams, columns, poles, or arches, or by rope or cables, or both. (SAF-IND)

3.3.301.1 ***Private Party Tent.*** A tent erected in the yard of a private residence for entertainment, recreation, dining, a reception, or similar function. (SAF-AXM)

3.3.302 Thermal Barrier. See 3.3.32.3.

3.3.303 Tower. An enclosed independent structure or portion of a building with elevated levels for support of equipment or occupied for observation, control, operation, signaling, or similar limited use. (SAF-IND)

3.3.303.1 ***Airport Traffic Control Tower.*** An enclosed structure or building at airports with elevated levels for support of equipment and occupied for observation, control, operation, and signaling of aircraft in flight and on the ground. (SAF-IND)

3.3.304 Toxic Material. See 3.3.184.7.

3.3.305 Two-Family Dwelling Unit. See 3.3.70.3.

3.3.306 Uncertainty Analysis. See 3.3.19.2.

3.3.307 Underground Structure. See 3.3.293.12.

3.3.308 Verification Method. A procedure or process used to demonstrate or confirm that the proposed design meets the specified criteria. (SAF-FUN)

3.3.309* Vertical Opening. An opening through a floor or roof. (SAF-FIR)

3.3.310 Vision Panel. A glazing material installed in a fire door assembly to allow for viewing through the fire door assembly. [**252,** 2017] (SAF-FIR)

3.3.311 Vomitory. An entrance to a means of egress from an assembly seating area that pierces the seating rows. (SAF-AXM)

3.3.312 Wall.

3.3.312.1 ***Fire Barrier Wall.*** A wall, other than a fire wall, that has a fire resistance rating. (SAF-FIR)

3.3.312.2 ***Proscenium Wall.*** The wall that separates the stage from the auditorium or house. (SAF-AXM)

3.3.313* Wall or Ceiling Covering. A textile-, paper-, or polymeric-based product designed to be attached to a wall or ceiling surface for decorative or acoustical purposes. (SAF-INT)

3.3.314 Water-Surrounded Structure. See 3.3.293.13.

3.3.315 Weathered-Membrane Material. See 3.3.184.8.

3.3.316 Yard. An open, unoccupied space other than a court, unobstructed from the finished ground level to the sky on the lot on which a building is situated. (SAF-MEA)

Chapter 4 General

4.1* Goals.

4.1.1* Fire. A goal of this *Code* is to provide an environment for the occupants that is reasonably safe from fire by the following means:

(1)* Protection of occupants not intimate with the initial fire development
(2) Improvement of the survivability of occupants intimate with the initial fire development

4.1.2* Comparable Emergencies. An additional goal is to provide life safety during emergencies that can be mitigated using methods comparable to those used in case of fire.

4.1.3* Hazardous Materials Emergencies. An additional goal is to provide reasonable life safety during emergency events involving hazardous materials regulated by NFPA 30, NFPA 45, NFPA 54, NFPA 55, NFPA 58, *NFPA 72,* NFPA 400, and NFPA 495.

4.1.4* Crowd Movement. An additional goal is to provide for reasonably safe emergency crowd movement and, where required, reasonably safe nonemergency crowd movement.

4.2 Objectives.

4.2.1 Occupant Protection. A structure shall be designed, constructed, and maintained to protect occupants who are not intimate with the initial fire development for the time needed to evacuate, relocate, or defend in place.

4.2.2 Structural Integrity. Structural integrity shall be maintained for the time needed to evacuate, relocate, or defend in place occupants who are not intimate with the initial fire development.

4.2.3* Hazardous Materials Emergencies Protection. Fundamental safeguards shall be provided to reasonably prevent or mitigate events involving hazardous materials as addressed in 4.1.3 to allow the time needed to evacuate, relocate, or defend in place occupants who are not intimate with the initial emergency incident.

4.2.4* Security Features. Where buildings are designed and constructed to include security features to protect occupants or contents, such features shall not compromise compliance with other requirements of this *Code*.

4.2.5 Systems Effectiveness. Systems utilized to achieve the goals of Section 4.1 shall be effective in mitigating the hazard or condition for which they are being used, shall be reliable, shall be maintained to the level at which they were designed to operate, and shall remain operational.

4.3* Assumptions.

4.3.1* General. The protection methods of this *Code* are based on the hazards associated with fire and other events that have comparable impact on a building and its occupants.

4.3.2 Single Fire Source. The fire protection methods of this *Code* assume a single fire source.

4.4 Life Safety Compliance Options.

4.4.1 Options. Life safety meeting the goals and objectives of Sections 4.1 and 4.2 shall be provided in accordance with either of the following:

(1) Prescriptive-based provisions per 4.4.2
(2) Performance-based provisions per 4.4.3

4.4.2 Prescriptive-Based Option.

4.4.2.1 A prescriptive-based life safety design shall be in accordance with Chapters 1 through 4, Chapters 6 through 11, Chapter 43, and the applicable occupancy chapter, Chapters 12 through 42.

4.4.2.2 Prescriptive-based designs meeting the requirements of Chapters 1 through 3, Sections 4.5 through 4.8, and Chapters 6 through 43 of this *Code* shall be deemed to satisfy the provisions of Sections 4.1 and 4.2.

4.4.2.3 Where a requirement of this *Code* conflicts with another requirement of this *Code*, the following shall apply:

(1)* Where a specific requirement contained in Chapters 11 through 43 conflicts with a general requirement contained in Chapters 1 through 4 and Chapters 6 through 10, the requirement of Chapters 11 through 43 shall govern.
(2)* Where a requirement contained in Chapters 1 through 4 and Chapters 6 through 10 conflicts with another requirement contained in Chapters 1 through 4 and Chapters 6 through 10, the more specific requirement shall govern.
(3)* Where a requirement contained in Chapters 11 through 43 conflicts with another requirement contained in Chapters 11 through 43, the more specific requirement shall govern.

4.4.3 Performance-Based Option. A performance-based life safety design shall be in accordance with Chapters 1 through 5.

4.5 Fundamental Requirements.

4.5.1 Multiple Safeguards. The design of every building or structure intended for human occupancy shall be such that reliance for safety to life does not depend solely on any single safeguard. An additional safeguard(s) shall be provided for life safety in case any single safeguard is rendered ineffective.

4.5.2 Appropriateness of Safeguards. Every building or structure shall be provided with means of egress and other fire and life safety safeguards of the kinds, numbers, locations, and capacities appropriate to the individual building or structure, with due regard to the following:

(1) Character of the occupancy, including fire load
(2) Capabilities of the occupants
(3) Number of persons exposed
(4) Fire protection available
(5) Capabilities of response personnel
(6) Height and construction type of the building or structure
(7) Other factors necessary to provide occupants with a reasonable degree of safety

4.5.3 Means of Egress.

4.5.3.1 Number of Means of Egress. Two means of egress, as a minimum, shall be provided in every building or structure, section, and area where size, occupancy, and arrangement endanger occupants attempting to use a single means of egress that is blocked by fire or smoke. The two means of egress shall be arranged to minimize the possibility that both might be rendered impassable by the same emergency condition.

4.5.3.2 Unobstructed Egress. In every occupied building or structure, means of egress from all parts of the building shall be maintained free and unobstructed. Means of egress shall be accessible to the extent necessary to ensure reasonable safety for occupants having impaired mobility.

4.5.3.3 Awareness of Egress System. Every exit shall be clearly visible, or the route to reach every exit shall be conspicuously indicated. Each means of egress, in its entirety, shall be arranged or marked so that the way to a place of safety is indicated in a clear manner.

4.5.3.4 Lighting. Where artificial illumination is needed in a building or structure, egress facilities shall be included in the lighting design.

4.5.4* Occupant Notification. In every building or structure of such size, arrangement, or occupancy that a fire itself might not provide adequate occupant warning, fire alarm systems shall be provided where necessary to warn occupants of the existence of fire.

4.5.5* Situation Awareness. Systems used to achieve the goals of Section 4.1 shall be effective in facilitating and enhancing situation awareness, as appropriate, by building management, other occupants and emergency responders of the functionality or state of critical building systems, the conditions that might warrant emergency response, and the appropriate nature and timing of such responses.

4.5.6 Vertical Openings. Every vertical opening between the floors of a building shall be suitably enclosed or protected, as necessary, to afford reasonable safety to occupants while using the means of egress and to prevent the spread of fire, smoke, or fumes through vertical openings from floor to floor before occupants have entered exits.

4.5.7 System Design/Installation. Any fire protection system, building service equipment, feature of protection, or safeguard provided to achieve the goals of this *Code* shall be designed, installed, and approved in accordance with applicable NFPA standards.

4.5.8 Inspection, Testing, and Maintenance. Whenever or wherever any device, equipment, system, condition, arrangement, level of protection, or any other feature is required for compliance with the provisions of this *Code*, such device, equipment, system, condition, arrangement, level of protection, or other feature shall thereafter be inspected, tested, and maintained in accordance with applicable NFPA requirements or as directed by the authority having jurisdiction, unless the *Code* exempts such inspection, testing, or maintenance.

4.6 General Requirements.

4.6.1 Authority Having Jurisdiction.

4.6.1.1 The authority having jurisdiction shall determine whether the provisions of this *Code* are met.

4.6.1.2 Any requirements that are essential for the safety of building occupants and that are not specifically provided for by this *Code* shall be determined by the authority having jurisdiction.

4.6.1.3 Where it is evident that a reasonable degree of safety is provided, any requirement shall be permitted to be modified if, in the judgment of the authority having jurisdiction, its application would be hazardous under normal occupancy conditions.

4.6.1.4 Technical Assistance.

4.6.1.4.1 The authority having jurisdiction shall be permitted to require a review by an approved independent third party with expertise in the matter to be reviewed at the submitter's expense. [**1:**1.16.1]

4.6.1.4.2 The independent reviewer shall provide an evaluation and recommend necessary changes of the proposed design, operation, process, or new technology to the authority having jurisdiction. [**1:**1.16.2]

4.6.1.4.3 The authority having jurisdiction shall be authorized to require design submittals to bear the stamp of a registered design professional. [**1:**1.16.3]

4.6.2 Previously Approved Features. Where another provision of this *Code* exempts a previously approved feature from a requirement, the exemption shall be permitted, even where the following conditions exist:

(1) The area is being modernized, renovated, or otherwise altered.
(2) A change of occupancy has occurred, provided that the feature's continued use is approved by the authority having jurisdiction.

4.6.3 Stories in Height. Unless otherwise specified in another provision of this *Code*, the stories in height of a building shall be determined as follows:

(1) The stories in height shall be counted starting with the level of exit discharge and ending with the highest occupiable story containing the occupancy considered.
(2) Stories below the level of exit discharge shall not be counted as stories.

(3) Interstitial spaces used solely for building or process systems directly related to the level above or below shall not be considered a separate story.
(4) A mezzanine shall not be counted as a story for the purpose of determining the allowable stories in height.
(5) For purposes of application of the requirements for occupancies other than assembly, health care, detention and correctional, and ambulatory health care, where a maximum one-story abovegrade parking structure, enclosed, open, or a combination thereof, of Type I or Type II (222) construction or open Type IV construction, with grade entrance, is provided under a building, the number of stories shall be permitted to be measured from the floor above such a parking area.

4.6.4 Historic Buildings.

4.6.4.1 Rehabilitation projects in historic buildings shall comply with Chapter 43.

4.6.4.2* The provisions of this *Code* shall be permitted to be modified by the authority having jurisdiction for buildings or structures identified and classified as historic buildings or structures where it is evident that a reasonable degree of safety is provided.

4.6.5* Modification of Requirements for Existing Buildings. Where it is evident that a reasonable degree of safety is provided, the requirements for existing buildings shall be permitted to be modified if their application would be impractical in the judgment of the authority having jurisdiction.

4.6.6* Time Allowed for Compliance. A limited but reasonable time, commensurate with the magnitude of expenditure, disruption of services, and degree of hazard, shall be allowed for compliance with any part of this *Code* for existing buildings.

4.6.7 Building Rehabilitation.

4.6.7.1 Rehabilitation work on existing buildings shall be classified as one of the following work categories in accordance with 43.2.2.1:

(1) Repair
(2) Renovation
(3) Modification
(4) Reconstruction
(5) Change of use or occupancy classification
(6) Addition

4.6.7.2 Rehabilitation work on existing buildings shall comply with Chapter 43.

4.6.7.3 Except where another provision of this *Code* exempts a previously approved feature from a requirement, the resulting feature shall be not less than that required for existing buildings.

4.6.7.4* Existing life safety features that exceed the requirements for new buildings shall be permitted to be decreased to those required for new buildings.

4.6.7.5* Existing life safety features that do not meet the requirements for new buildings, but that exceed the requirements for existing buildings, shall not be further diminished.

4.6.8 Provisions in Excess of *Code* Requirements. Nothing in this *Code* shall be construed to prohibit a better building construction type, an additional means of egress, or an otherwise safer condition than that specified by the minimum requirements of this *Code*.

4.6.9 Conditions for Occupancy.

4.6.9.1 No new construction or existing building shall be occupied in whole or in part in violation of the provisions of this *Code*, unless the following conditions exist:

(1) A plan of correction has been approved.
(2) The occupancy classification remains the same.
(3) No serious life safety hazard exists as judged by the authority having jurisdiction.

4.6.9.2 Where compliance with this *Code* is effected by means of a performance-based design, the owner shall annually certify compliance with the conditions and limitations of the design by submitting a warrant of fitness acceptable to the authority having jurisdiction. The warrant of fitness shall attest that the building features, systems, and use have been inspected and confirmed to remain consistent with design specifications outlined in the documentation required by Section 5.8 and that such features, systems, and use continue to satisfy the goals and objectives specified in Sections 4.1 and 4.2. *(See Chapter 5.)*

4.6.10 Construction, Repair, and Improvement Operations.

4.6.10.1* Buildings, or portions of buildings, shall be permitted to be occupied during construction, repair, alterations, or additions only where required means of egress and required fire protection features are in place and continuously maintained for the portion occupied or where alternative life safety measures acceptable to the authority having jurisdiction are in place.

4.6.10.2 Where required by Chapters 11 through 43, construction, alteration, and demolition operations shall comply with NFPA 241.

4.6.10.3* In buildings under construction, adequate escape facilities shall be maintained at all times for the use of construction workers. Escape facilities shall consist of doors, walkways, stairs, ramps, fire escapes, ladders, or other approved means or devices arranged in accordance with the general principles of the *Code* insofar as they can reasonably be applied to buildings under construction.

4.6.10.4 Flammable or explosive substances or equipment for repairs or alterations shall be permitted in a building while the building is occupied if the condition of use and safeguards provided do not create any additional danger or impediment to egress beyond the normally permissible conditions in the building.

4.6.11 Change of Use or Occupancy Classification. In any building or structure, whether or not a physical alteration is needed, a change from one use or occupancy classification to another shall comply with 4.6.7.

4.6.12 Maintenance, Inspection, and Testing.

4.6.12.1 Whenever or wherever any device, equipment, system, condition, arrangement, level of protection, fire-resistive construction, or any other feature is required for compliance with the provisions of this *Code*, such device, equipment, system, condition, arrangement, level of protection, fire-resistive construction, or other feature shall thereafter be continuously maintained. Maintenance shall be provided in accordance with applicable NFPA requirements or require-

ments developed as part of a performance-based design, or as directed by the authority having jurisdiction.

4.6.12.2 No existing life safety feature shall be removed or reduced where such feature is a requirement for new construction.

4.6.12.3* Existing life safety features obvious to the public, if not required by the *Code*, shall be either maintained or removed.

4.6.12.4* Where a door or door frame is not required to be fire protection rated and is equipped with a fire protection listing label, the door and the door frame shall not be required to comply with NFPA 80.

4.6.12.5 Any device, equipment, system, condition, arrangement, level of protection, fire-resistive construction, or any other feature requiring periodic testing, inspection, or operation to ensure its maintenance shall be tested, inspected, or operated as specified elsewhere in this *Code* or as directed by the authority having jurisdiction.

4.6.12.6 Maintenance, inspection, and testing shall be performed under the supervision of a responsible person who shall ensure that testing, inspection, and maintenance are made at specified intervals in accordance with applicable NFPA standards or as directed by the authority having jurisdiction.

4.6.12.7 Maintenance, inspection, and testing records shall be documented using approved reports or forms and shall be permitted to be submitted, stored, accessed, and shared electronically in an approved format.

4.6.13* Noncombustible Material.

4.6.13.1 A material that complies with any one of the following shall be considered a noncombustible material:

(1)* The material, in the form in which it is used, and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors when subjected to fire or heat.
(2) The material is reported as passing ASTM E136, *Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C.*
(3) The material is reported as complying with the pass/fail criteria of ASTM E136 when tested in accordance with the test method and procedure in ASTM E2652, *Standard Test Method for Assessing Combustibility of Materials Using a Tube Furnace with a Cone-shaped Airflow Stabilizer, at 750°C.* [**5000:**7.1.4.1.1]

4.6.13.2 Where the term *limited-combustible* is used in this *Code*, it shall also include the term *noncombustible*. [**5000:**7.1.4.1.2]

4.6.14* Limited-Combustible Material. A material shall be considered a limited-combustible material where one of the following is met:

(1) The conditions of 4.6.14.1 and 4.6.14.2, and the conditions of either 4.6.14.3 or 4.6.14.4, shall be met.
(2) The conditions of 4.6.14.5 shall be met. [**5000:**7.1.4.2]

4.6.14.1 The material does not comply with the requirements for a noncombustible material in accordance with 4.6.13. [**5000:**7.1.4.2.1]

4.6.14.2 The material, in the form in which it is used, exhibits a potential heat value not exceeding 3500 Btu/lb (8141 kJ/kg) when tested in accordance with NFPA 259. [**5000:**7.1.4.2.2]

4.6.14.3 The material shall have a structural base of noncombustible material with a surfacing not exceeding a thickness of ⅛ in. (3.2 mm) where the surfacing exhibits a flame spread index not greater than 50 when tested in accordance with ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, or UL 723, *Test for Surface Burning Characteristics of Building Materials*. [**5000:**7.1.4.2.3]

4.6.14.4 The material shall be composed of materials that in the form and thickness used neither exhibit a flame spread index greater than 25 nor exhibit evidence of continued progressive combustion when tested in accordance with ASTM E84 or UL 723 and are of such composition that all surfaces that would be exposed by cutting through the material on any plane would neither exhibit a flame spread index greater than 25 nor exhibit evidence of continued progressive combustion when tested in accordance with ASTM E84 or UL 723. [**5000:**7.1.4.2.4]

4.6.14.5 Materials shall be considered limited-combustible materials where tested in accordance with ASTM E2965, *Standard Test Method for Determination of Low Levels of Heat Release Rate for Materials and Products Using an Oxygen Consumption Calorimeter*, at an incident heat flux of 75 kW/m^2 for a 20-minute exposure, and both the following conditions are met:

(1) The peak heat release rate shall not exceed 150 kW/m^2 for longer than 10 seconds.
(2) The total heat released shall not exceed 8 MJ/m^2.

[**5000:**7.1.4.2.5]

4.6.14.6 Where the term *limited-combustible* is used in this *Code*, it shall also include the term *noncombustible*. [**5000:**7.1.4.2.6]

Δ **4.6.15 Fire-Retardant-Treated Wood.** Fire-retardant-treated wood shall be a wood product impregnated with chemical by a pressure process or other means during manufacture meeting the requirements in 4.6.15.2 through 4.6.15.2.5. [**703:**4.1.1]

N **4.6.15.1** Materials treated by means other than those specified in 4.6.15 shall be considered a fire-retardant-coated material and shall meet the requirements of fire-retardant coatings in Chapter 5 of *NFPA 5000*. [**703:**4.1.1.1]

4.6.15.2 Fire-retardant-treated wood shall be tested in accordance with ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, or UL 723, *Test for Surface Burning Characteristics of Building Materials*. [**703:**4.1.1.2]

4.6.15.2.1 Fire-retardant-treated wood shall have a listed flame spread index of 25 or less. [**703:**4.1.1.2.1]

4.6.15.2.2 The flame front shall not progress more than 10.5 ft (3.2 m) beyond the centerline of the burners at any time during the test, when the test is continued for an additional 20-minute period. [**703:**4.1.1.2.2]

N **4.6.15.2.3** A wood product that has been impregnated with chemicals by a pressure process or other means during manufacture and has met the requirements of 4.6.15.2.1 and 4.6.15.2.2 when tested on the front and back faces in accordance with ASTM E2768, *Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test)*,shall be considered fire-retardant-treated wood. [**703:**4.1.1.2.3]

4.6.15.2.4 Wood structural panels shall be permitted to be tested only on the front and back faces. [**703:**4.1.1.2.4]

N **4.6.15.2.5** Wood structural panels that meet all of the following conditions shall be considered fire-retardant-treated wood:

(1) They have been impregnated with chemicals.
(2) They have been tested on the front and back faces in accordance with ASTM E2768, *Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test)*, with a ripped or cut longitudinal gap of ⅛ in. (3.2 mm).
(3) They are listed to meet the requirements of 4.6.15.2.1 and 4.6.15.2.2. [**703:**4.1.1.2.5]

4.6.16 Fire-Retardant-Treated Wood Treatment.

4.6.16.1 Pressure Process. For wood products impregnated with chemicals by a pressure process, the process shall be performed in closed vessels under gauge pressures not less than 50 psi (345 kPa). The treatment shall provide permanent protection to all surfaces of the wood product. [**703:**4.1.2.1]

Δ **4.6.16.2 Other Means During Manufacture.**

N **4.6.16.2.1** For wood products impregnated with chemicals by other means during manufacture, the treatment shall be an integral part of the manufacturing process of the wood product. [**703:**4.1.2.2.1]

N **4.6.16.2.2** The treatment shall provide permanent protection to all surfaces of the wood product. [**703:**4.1.2.2.2]

4.6.16.3 Wood Structural Panels. Adjustment to design values for wood structural panels shall be in accordance with the following:

(1) The effect of the treatment, the method of redrying after treatment, and the exposure to high temperatures and high humidities on the flexure properties of fire-retardant-treated softwood plywood shall be determined in accordance with ASTM D5516, *Standard Test Method for Evaluating the Flexural Properties of Fire-Retardant-Treated Softwood Plywood Exposed to Elevated Temperatures*.
(2) The test data developed by ASTM D5516 shall be used to develop adjustment factors or maximum loads and spans, or both, for untreated plywood design values in accordance with ASTM D6305, *Standard Practice for Calculating Bending Strength Design Adjustment Factors for Fire-Retardant-Treated Plywood Roof Sheathing*.
(3) Each manufacturer shall publish the allowable maximum loads and spans for service as floor and roof sheathing for their treatment. [**5000:**45.5.16.3]

4.6.16.4 Lumber. Adjustment to design values for lumber shall be in accordance with the following:

(1) For each species of wood treated, the effect of the treatment, the method of redrying after treatment, and the exposure to high temperatures and high humidities on the allowable design properties of fire-retardant-treated lumber shall be determined in accordance with ASTM D5664, *Standard Test Method for Evaluating the Effects of Fire-Retardant Treatments and Elevated Temperatures on Strength Properties of Fire-Retardant-Treated Lumber*.
(2) The test data developed by ASTM D5664 shall be used to develop modification factors for use at or near room temperature and at elevated temperatures and humidity in accordance with ASTM D6841, *Standard Practice for Calculating Design Value Treatment Adjustment Factors for Fire-Retardant-Treated Lumber*.
(3) Each manufacturer shall publish the modification factors for service at ambient temperatures of up to 100°F (37.8°C) and for service as roof framing.
(4) The roof framing modification factors shall take into consideration the climatological location. [**5000:**45.5.16.4]

4.6.16.5 Exposure to Weather or Damp or Wet Locations. Where fire-retardant-treated wood is exposed to weather or damp or wet locations, it shall be identified as "exterior" to indicate that there is no increase in the listed flame spread index when subjected to ASTM D2898, *Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing*. [**5000:**45.5.16.5]

4.6.16.6 Interior Applications. Interior fire-retardant-treated wood shall have a moisture content of not over 28 percent when tested in accordance with the procedures of ASTM D3201/D3201M, *Standard Test Method for Hygroscopic Properties of Fire-Retardant-Wood and Wood-Based Products*, at 92 percent relative humidity. Interior fire-retardant-treated wood shall be tested in accordance with 4.6.16.3 or 4.6.16.4. [**5000:**45.5.16.7]

4.6.16.7 Moisture Content. Fire-retardant-treated wood shall have a moisture content of 19 percent or less for lumber and 15 percent or less for wood structural panels before use. For wood kiln dried after treatment (KDAT), the kiln temperatures shall not exceed the temperatures used in drying the lumber and plywood submitted for the testing described in 4.6.16.3 or 4.6.16.4. [**5000:**45.5.16.8]

4.6.17 Grade Plane. The grade plane shall be established by calculating the average of the finished ground level adjoining the building at all exterior walls. Where the finished ground level slopes down from the exterior walls, the grade plane shall be established by the lowest points within the area between the building and the lot line or, where the lot line is more than 6 ft (1.8 m) from the building, between the building and a point 6 ft (1.8 m) from the building.

4.7* Fire Drills.

4.7.1 Where Required. Emergency egress and relocation drills conforming to the provisions of this *Code* shall be conducted as specified by the provisions of Chapters 11 through 43, or by appropriate action of the authority having jurisdiction. Drills shall be designed in cooperation with the local authorities.

4.7.2* Drill Frequency. Emergency egress and relocation drills, where required by Chapters 11 through 43 or the authority having jurisdiction, shall be held with sufficient frequency to familiarize occupants with the drill procedure and to establish conduct of the drill as a matter of routine. Drills shall include suitable procedures to ensure that all persons subject to the drill participate.

4.7.3 Orderly Evacuation. When conducting drills, emphasis shall be placed on orderly evacuation rather than on speed.

4.7.4* Simulated Conditions. Drills shall be held at expected and unexpected times and under varying conditions to simulate the unusual conditions that can occur in an actual emergency.

4.7.5 Relocation Area. Drill participants shall relocate to a predetermined location and remain at such location until a recall or dismissal signal is given.

4.7.6* A written record of each drill shall be completed by the person responsible for conducting the drill and maintained in an approved manner.

4.8 Emergency Action Plan.

4.8.1 Where Required. Emergency action plans shall be provided as follows:

(1) Where required by the provisions of Chapters 11 through 42
(2) Where required by action of the authority having jurisdiction

4.8.2 Plan Requirements.

4.8.2.1* Emergency action plans shall include the following:

(1) Procedures for reporting of emergencies
(2) Occupant and staff response to emergencies
(3)* Evacuation, relocation, and shelter-in-place procedures appropriate to the building, its occupancy, emergencies, and hazards
(4) Appropriateness of the use of elevators
(5) Design and conduct of fire drills
(6) Type and coverage of building fire protection systems
(7) Specific details, locations, and operational features of security features that could impact or be integrated with life safety systems
(8) Design and conduct of life safety, security, lockdown, and other drills not associated with fire
(9) Operational features that are to be integrated with a voice evacuation system, a mass notification system, or both, to meet design and operational requirements of other installation standards
(10) Other items required by the authority having jurisdiction

4.8.2.2 Required emergency action plans shall be submitted to the authority having jurisdiction for review.

4.8.2.3* Emergency action plans shall be reviewed and updated as required by the authority having jurisdiction.

Chapter 5 Performance-Based Option

5.1 General Requirements.

5.1.1* Application. The requirements of this chapter shall apply to life safety systems designed to the performance-based option permitted by 4.4.1 and 4.4.3.

5.1.2 Goals and Objectives. The performance-based design shall meet the goals and objectives of this *Code* in accordance with Sections 4.1 and 4.2.

5.1.3 Qualifications. The performance-based design shall be prepared by a registered design professional.

5.1.4* Independent Review. The authority having jurisdiction shall be permitted to require an approved, independent third party to review the proposed design and provide an evaluation of the design to the authority having jurisdiction.

5.1.5 Sources of Data. Data sources shall be identified and documented for each input data requirement that must be met using a source other than a design fire scenario, an assumption, or a building design specification. The degree of conservatism reflected in such data shall be specified, and a justification for the source shall be provided.

5.1.6* Final Determination. The authority having jurisdiction shall make the final determination as to whether the performance objectives have been met.

5.1.7* Maintenance of Design Features. The design features required for the building to continue to meet the performance goals and objectives of this *Code* shall be maintained for the life of the building. Such performance goals and objectives shall include complying with all documented assumptions and design specifications. Any variations shall require the approval of the authority having jurisdiction prior to the actual change. *(See also 4.6.9.2.)*

5.1.8 Definitions.

5.1.8.1 General. For definitions, see Chapter 3, Definitions.

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

(1) **Alternative Calculation Procedure.** See 3.3.17.
(2) **Data Conversion.** See 3.3.55.
(3) **Design Fire Scenario.** See 3.3.109.1.
(4) **Design Specification.** See 3.3.282.1.
(5) **Design Team.** See 3.3.62.
(6) **Exposure Fire.** See 3.3.93.
(7) **Fire Model.** See 3.3.106.
(8) **Fire Scenario.** See 3.3.109.
(9) **Fuel Load.** See 3.3.177.1.
(10) **Incapacitation.** See 3.3.160.
(11) **Input Data Specification.** See 3.3.282.2.
(12) **Occupant Characteristics.** See 3.3.206.
(13) **Performance Criteria.** See 3.3.221.
(14) **Proposed Design.** See 3.3.235.
(15) **Safe Location.** See 3.3.253.
(16) **Safety Factor.** See 3.3.254.
(17) **Safety Margin.** See 3.3.255.
(18) **Sensitivity Analysis.** See 3.3.19.1.
(19) **Stakeholder.** See 3.3.287.
(20) **Uncertainty Analysis.** See 3.3.19.2.
(21) **Verification Method.** See 3.3.308.

5.2 Performance Criteria.

5.2.1 General. A design shall meet the objectives specified in Section 4.2 if, for each design fire scenario, assumption, and design specification, the performance criterion in 5.2.2 is met.

5.2.2* Performance Criterion. Any occupant who is not intimate with ignition shall not be exposed to instantaneous or cumulative untenable conditions.

5.3 Retained Prescriptive Requirements.

5.3.1* Systems and Features. All fire protection systems and features of the building shall comply with applicable NFPA standards for those systems and features.

5.3.2 Means of Egress. The design shall comply with the following requirements in addition to the performance criteria of Section 5.2 and the methods of Sections 5.4 through 5.8:

(1) Changes in level in means of egress — 7.1.7
(2) Guards — 7.1.8
(3) Doors — 7.2.1
(4) Stairs — 7.2.2, excluding the provisions of 7.2.2.5.1, 7.2.2.5.2, 7.2.2.6.2, 7.2.2.6.3, and 7.2.2.6.4
(5) Ramps — 7.2.5, excluding the provisions of 7.2.5.4.1, 7.2.5.5, and 7.2.5.7.1
(6) Fire escape ladders — 7.2.9

(7) Alternating tread devices — 7.2.11
(8) Capacity of means of egress — Section 7.3, excluding the provisions of 7.3.3 and 7.3.4
(9) Impediments to egress — 7.5.2
(10) Illumination of means of egress — Section 7.8
(11) Emergency lighting — Section 7.9
(12) Marking of means of egress — Section 7.10

5.3.3 Equivalency. Equivalent designs for the features covered in the retained prescriptive requirements mandated by 5.3.2 shall be addressed in accordance with the equivalency provisions of Section 1.4.

5.4 Design Specifications and Other Conditions.

5.4.1* Clear Statement. Design specifications and other conditions used in the performance-based design shall be clearly stated and shown to be realistic and sustainable.

5.4.2 Assumptions and Design Specifications Data.

5.4.2.1 Each assumption and design specification used in the design shall be accurately translated into input data specifications, as appropriate for the method or model.

5.4.2.2 Any assumption and design specifications that the design analyses do not explicitly address or incorporate and that are, therefore, omitted from input data specifications shall be identified, and a sensitivity analysis of the consequences of that omission shall be performed.

5.4.2.3 Any assumption and design specifications modified in the input data specifications, because of limitations in test methods or other data-generation procedures, shall be identified, and a sensitivity analysis of the consequences of the modification shall be performed.

5.4.3 Building Characteristics. Characteristics of the building or its contents, equipment, or operations that are not inherent in the design specifications, but that affect occupant behavior or the rate of hazard development, shall be explicitly identified.

5.4.4* Operational Status and Effectiveness of Building Features and Systems. The performance of fire protection systems, building features, and emergency procedures shall reflect the documented performance and reliability of the components of those systems or features, unless design specifications are incorporated to modify the expected performance.

5.4.5 Occupant Characteristics.

5.4.5.1* General. The selection of occupant characteristics to be used in the design calculations shall be approved by the authority having jurisdiction and shall provide an accurate reflection of the expected population of building users. Occupant characteristics shall represent the normal occupant profile, unless design specifications are used to modify the expected occupant features. Occupant characteristics shall not vary across fire scenarios, except as authorized by the authority having jurisdiction.

5.4.5.2* Response Characteristics. The basic response characteristics of sensibility, reactivity, mobility, and susceptibility shall be evaluated. Such evaluation shall include the expected distribution of characteristics of a population appropriate to the use of the building. The source of data for these characteristics shall be documented.

5.4.5.3 Location. It shall be assumed that, in every normally occupied room or area, at least one person shall be located at the most remote point from the exits.

5.4.5.4* Number of Occupants. The design shall be based on the maximum number of people that every occupied room or area is expected to contain. Where the success or failure of the design is contingent on the number of occupants not exceeding a specified maximum, operational controls shall be used to ensure that the maximum number of occupants is not exceeded.

5.4.5.5* Staff Assistance. The inclusion of trained employees as part of the fire safety system shall be identified and documented.

5.4.6 Emergency Response Personnel. Design characteristics or other conditions related to the availability, speed of response, effectiveness, roles, and other characteristics of emergency response personnel shall be specified, estimated, or characterized sufficiently for evaluation of the design.

5.4.7* Post-Construction Conditions. Design characteristics or other conditions related to activities during the life of a building that affect the ability of the building to meet the stated goals and objectives shall be specified, estimated, or characterized sufficiently for evaluation of the design.

5.4.8 Off-Site Conditions. Design characteristics or other conditions related to resources or conditions outside the property being designed that affect the ability of the building to meet the stated goals and objectives shall be specified, estimated, or characterized sufficiently for evaluation of the design.

5.4.9* Consistency of Assumptions. The design shall not include mutually inconsistent assumptions, specifications, or statements of conditions.

5.4.10* Special Provisions. Additional provisions that are not covered by the design specifications, conditions, estimations, and assumptions provided in Section 5.4, but that are required for the design to comply with the performance objectives, shall be documented.

5.5* Design Fire Scenarios.

5.5.1 Approval of Parameters. The authority having jurisdiction shall approve the parameters involved in design fire scenarios. The proposed design shall be considered to meet the goals and objectives if it achieves the performance criteria for each required design fire scenario. *(See 5.5.3.)*

5.5.2* Evaluation. Design fire scenarios shall be evaluated using a method acceptable to the authority having jurisdiction and appropriate for the conditions. Each design fire scenario shall be as challenging as any that could occur in the building, but shall be realistic, with respect to at least one of the following scenario specifications:

(1) Initial fire location
(2) Early rate of growth in fire severity
(3) Smoke generation

5.5.3* Required Design Fire Scenarios. Design fire scenarios shall comply with the following:

(1) Scenarios selected as design fire scenarios shall include, but shall not be limited to, those specified in 5.5.3.1 through 5.5.3.8.

(2) Design fire scenarios demonstrated by the design team to the satisfaction of the authority having jurisdiction as inappropriate for the building use and conditions shall not be required to be evaluated fully.

5.5.3.1* Design Fire Scenario 1. Design Fire Scenario 1 shall be described as follows:

(1) It is an occupancy-specific fire representative of a typical fire for the occupancy.
(2) It explicitly accounts for the following:
   (a) Occupant activities
   (b) Number and location of occupants
   (c) Room size
   (d) Contents and furnishings
   (e) Fuel properties and ignition sources
   (f) Ventilation conditions
   (g) Identification of the first item ignited and its location

5.5.3.2* Design Fire Scenario 2. Design Fire Scenario 2 shall be described as follows:

(1) It is an ultrafast-developing fire, in the primary means of egress, with interior doors open at the start of the fire.
(2) It addresses the concern regarding a reduction in the number of available means of egress.

5.5.3.3* Design Fire Scenario 3. Design Fire Scenario 3 shall be described as follows:

(1) It is a fire that starts in a normally unoccupied room, potentially endangering a large number of occupants in a large room or other area.
(2) It addresses the concern regarding a fire starting in a normally unoccupied room and migrating into the space that potentially holds the greatest number of occupants in the building.

5.5.3.4* Design Fire Scenario 4. Design Fire Scenario 4 shall be described as follows:

(1) It is a fire that originates in a concealed wall or ceiling space adjacent to a large, occupied room.
(2) It addresses the concern regarding a fire originating in a concealed space that does not have either a detection system or a suppression system and then spreading into the room within the building that potentially holds the greatest number of occupants.

5.5.3.5* Design Fire Scenario 5. Design Fire Scenario 5 shall be described as follows:

(1) It is a slowly developing fire, shielded from fire protection systems, in close proximity to a high occupancy area.
(2) It addresses the concern regarding a relatively small ignition source causing a significant fire.

5.5.3.6* Design Fire Scenario 6. Design Fire Scenario 6 shall be described as follows:

(1) It is the most severe fire resulting from the largest possible fuel load characteristic of the normal operation of the building.
(2) It addresses the concern regarding a rapidly developing fire with occupants present.

5.5.3.7* Design Fire Scenario 7. Design Fire Scenario 7 shall be described as follows:

(1) It is an outside exposure fire.
(2) It addresses the concern regarding a fire starting at a location remote from the area of concern and either spreading into the area, blocking escape from the area, or developing untenable conditions within the area.

5.5.3.8* Design Fire Scenario 8. Design Fire Scenario 8 shall be described as follows:

(1) It is a fire originating in ordinary combustibles in a room or area with each passive or active fire protection system independently rendered ineffective.
(2) It addresses concerns regarding the unreliability or unavailability of each fire protection system or fire protection feature, considered individually.
(3)* It is not required to be applied to fire protection systems for which both the level of reliability and the design performance in the absence of the system are acceptable to the authority having jurisdiction.

5.5.4 Design Fire Scenarios Data.

5.5.4.1 Each design fire scenario used in the performance-based design proposal shall be translated into input data specifications, as appropriate for the calculation method or model.

5.5.4.2 Any design fire scenario specifications that the design analyses do not explicitly address or incorporate and that are, therefore, omitted from input data specifications shall be identified, and a sensitivity analysis of the consequences of that omission shall be performed.

5.5.4.3 Any design fire scenario specifications modified in input data specifications, because of limitations in test methods or other data-generation procedures, shall be identified, and a sensitivity analysis of the consequences of the modification shall be performed.

5.6* Evaluation of Proposed Designs.

5.6.1 General. A proposed design's performance shall be assessed relative to each performance objective in Section 4.2 and each applicable scenario in 5.5.3, with the assessment conducted through the use of appropriate calculation methods. The authority having jurisdiction shall approve the choice of assessment methods.

5.6.2 Use. The design professional shall use the assessment methods to demonstrate that the proposed design will achieve the goals and objectives, as measured by the performance criteria in light of the safety margins and uncertainty analysis, for each scenario, given the assumptions.

5.6.3 Input Data.

5.6.3.1 Data. Input data for computer fire models shall be obtained in accordance with ASTM E1591, *Standard Guide for Obtaining Data for Fire Growth Models*. Data for use in analytical models that are not computer-based fire models shall be obtained using appropriate measurement, recording, and storage techniques to ensure the applicability of the data to the analytical method being used.

5.6.3.2 Data Requirements. A complete listing of input data requirements for all models, engineering methods, and other calculation or verification methods required or proposed as part of the performance-based design shall be provided.

5.6.3.3* Uncertainty and Conservatism of Data. Uncertainty in input data shall be analyzed and, as determined appropriate

by the authority having jurisdiction, addressed through the use of conservative values.

5.6.4* Output Data. The assessment methods used shall accurately and appropriately produce the required output data from input data, based on the design specifications, assumptions, and scenarios.

5.6.5 Validity. Evidence shall be provided to confirm that the assessment methods are valid and appropriate for the proposed building, use, and conditions.

5.7* Safety Factors. Approved safety factors shall be included in the design methods and calculations to reflect uncertainty in the assumptions, data, and other factors associated with the performance-based design.

5.8 Documentation Requirements.

5.8.1* General. All aspects of the design, including those described in 5.8.2 through 5.8.14, shall be documented. The format and content of the documentation shall be acceptable to the authority having jurisdiction.

5.8.2* Technical References and Resources. The authority having jurisdiction shall be provided with sufficient documentation to support the validity, accuracy, relevance, and precision of the proposed methods. The engineering standards, calculation methods, and other forms of scientific information provided shall be appropriate for the particular application and methodologies used.

5.8.3 Building Design Specifications. All details of the proposed building design that affect the ability of the building to meet the stated goals and objectives shall be documented.

5.8.4 Performance Criteria. Performance criteria, with sources, shall be documented.

5.8.5 Occupant Characteristics. Assumptions about occupant characteristics shall be documented.

5.8.6 Design Fire Scenarios. Descriptions of design fire scenarios shall be documented.

5.8.7 Input Data. Input data to models and assessment methods, including sensitivity analyses, shall be documented.

5.8.8 Output Data. Output data from models and assessment methods, including sensitivity analyses, shall be documented.

5.8.9 Safety Factors. The safety factors utilized shall be documented.

5.8.10 Prescriptive Requirements. Retained prescriptive requirements shall be documented.

5.8.11* Modeling Features.

5.8.11.1 Assumptions made by the model user, and descriptions of models and methods used, including known limitations, shall be documented.

5.8.11.2 Documentation shall be provided to verify that the assessment methods have been used validly and appropriately to address the design specifications, assumptions, and scenarios.

5.8.12 Evidence of Modeler Capability. The design team's relevant experience with the models, test methods, databases, and other assessment methods used in the performance-based design proposal shall be documented.

5.8.13 Performance Evaluation. The performance evaluation summary shall be documented.

5.8.14 Use of Performance-Based Design Option. Design proposals shall include documentation that provides anyone involved in the ownership or management of the building with notification of the following:

(1) Approval of the building as a performance-based design with certain specified design criteria and assumptions
(2) Need for required re-evaluation and reapproval in cases of remodeling, modification, renovation, change in use, or change in established assumptions

Chapter 6 Classification of Occupancy and Hazard of Contents

6.1 Classification of Occupancy.

6.1.1 General.

6.1.1.1 Occupancy Classification. The occupancy of a building or structure, or portion of a building or structure, shall be classified in accordance with 6.1.2 through 6.1.13. Occupancy classification shall be subject to the ruling of the authority having jurisdiction where there is a question of proper classification in any individual case.

6.1.1.2 Special Structures. Occupancies in special structures shall conform to the requirements of the specific occupancy chapter, Chapters 12 through 43, except as modified by Chapter 11.

6.1.2 Assembly. For requirements, see Chapters 12 and 13.

6.1.2.1* Definition — Assembly Occupancy. An occupancy (1) used for a gathering of 50 or more persons for deliberation, worship, entertainment, eating, drinking, amusement, awaiting transportation, or similar uses; or (2) used as a special amusement building, regardless of occupant load.

6.1.2.2 Other. (Reserved)

6.1.3 Educational. For requirements, see Chapters 14 and 15.

6.1.3.1* Definition — Educational Occupancy. An occupancy used for educational purposes through the twelfth grade by six or more persons for 4 or more hours per day or more than 12 hours per week.

6.1.3.2 Other Occupancies. Other occupancies associated with educational institutions shall be in accordance with the appropriate parts of this *Code*.

6.1.3.3 Incidental Instruction. In cases where instruction is incidental to some other occupancy, the section of this *Code* governing such other occupancy shall apply.

6.1.4 Day Care. For requirements, see Chapters 16 and 17.

6.1.4.1* Definition — Day-Care Occupancy. An occupancy in which four or more clients receive care, maintenance, and supervision, by other than their relatives or legal guardians, for less than 24 hours per day.

6.1.4.2 Other. (Reserved)

6.1.5 Health Care. For requirements, see Chapters 18 and 19.

6.1.5.1* Definition — Health Care Occupancy. An occupancy used to provide medical or other treatment or care simultane-

ously to four or more patients on an inpatient basis, where such patients are mostly incapable of self-preservation due to age, physical or mental disability, or because of security measures not under the occupants' control.

6.1.5.2 Other. (Reserved)

6.1.6 Ambulatory Health Care. For requirements, see Chapters 20 and 21.

6.1.6.1* Definition — Ambulatory Health Care Occupancy. An occupancy used to provide services or treatment simultaneously to four or more patients that provides, on an outpatient basis, one or more of the following:

(1) Treatment for patients that renders the patients incapable of taking action for self-preservation under emergency conditions without the assistance of others
(2) Anesthesia that renders the patients incapable of taking action for self-preservation under emergency conditions without the assistance of others
(3) Emergency or urgent care for patients who, due to the nature of their injury or illness, are incapable of taking action for self-preservation under emergency conditions without the assistance of others

6.1.6.2 Other. (Reserved)

6.1.7 Detention and Correctional. For requirements, see Chapters 22 and 23.

6.1.7.1* Definition — Detention and Correctional Occupancy. An occupancy, other than one whose primary intended use is health care, ambulatory health care, or residential board and care, used to lawfully incarcerate or lawfully detain one or more persons under varied degrees of restraint or security where such occupants are mostly incapable of self-preservation because of security measures not under the occupants' control.

6.1.7.2* Nonresidential Uses. Within detention and correctional facilities, uses other than residential housing shall be in accordance with the appropriate chapter of the *Code. (See 22.1.3.3 and 23.1.3.3.)*

6.1.8 Residential. For requirements, see Chapters 24 through 31.

6.1.8.1 Definition — Residential Occupancy. An occupancy that provides sleeping accommodations for purposes other than health care or detention and correctional.

6.1.8.1.1* Definition — One- and Two-Family Dwelling Unit. A building that contains not more than two dwelling units, each dwelling unit occupied by members of a single family with not more than three outsiders, if any, accommodated in rented rooms.

6.1.8.1.2 Definition — Lodging or Rooming House. A building or portion thereof that does not qualify as a one- or two-family dwelling, that provides sleeping accommodations for a total of 16 or fewer people on a transient or permanent basis, without personal care services, with or without meals, but without separate cooking facilities for individual occupants.

6.1.8.1.3* Definition — Hotel. A building or groups of buildings under the same management in which there are sleeping accommodations for more than 16 persons and primarily used by transients for lodging with or without meals.

6.1.8.1.4* Definition — Dormitory. A building or a space in a building in which group sleeping accommodations are provided for more than 16 persons who are not members of the same family in one room, or a series of closely associated rooms, under joint occupancy and single management, with or without meals, but without individual cooking facilities.

6.1.8.1.5 Definition — Apartment Building. A building or portion thereof containing three or more dwelling units with independent cooking and bathroom facilities.

6.1.8.2 Other. (Reserved)

6.1.9 Residential Board and Care. For requirements, see Chapters 32 and 33.

6.1.9.1* Definition — Residential Board and Care Occupancy. An occupancy used for lodging and boarding of four or more residents, not related by blood or marriage to the owners or operators, for the purpose of providing personal care services.

6.1.9.2 Other. (Reserved)

6.1.10 Mercantile. For requirements, see Chapters 36 and 37.

6.1.10.1* Definition — Mercantile Occupancy. An occupancy used for the display and sale of merchandise.

6.1.10.2 Other. (Reserved)

6.1.11 Business. For requirements, see Chapters 38 and 39.

6.1.11.1* Definition — Business Occupancy. An occupancy used for the transaction of business other than mercantile.

6.1.11.2 Other. (Reserved)

6.1.12 Industrial. For requirements, see Chapter 40.

6.1.12.1* Definition — Industrial Occupancy. An occupancy in which products are manufactured or in which processing, assembling, mixing, packaging, finishing, decorating, or repair operations are conducted.

6.1.12.2 Other. (Reserved)

6.1.13 Storage. For requirements, see Chapter 42.

6.1.13.1* Definition — Storage Occupancy. An occupancy used primarily for the storage or sheltering of goods, merchandise, products, or vehicles.

6.1.13.2 Other. (Reserved)

6.1.14 Multiple Occupancies.

6.1.14.1 General.

6.1.14.1.1* Multiple occupancies shall comply with the requirements of 6.1.14.1 and one of the following:

(1) Mixed occupancies — 6.1.14.3
(2) Separated occupancies — 6.1.14.4

6.1.14.1.2 Where exit access from an occupancy traverses another occupancy, the multiple occupancy shall be treated as a mixed occupancy.

6.1.14.1.3* Where incidental to another occupancy, areas used as follows shall be permitted to be considered part of the predominant occupancy and shall be subject to the provisions of the *Code* that apply to the predominant occupancy:

(1) Mercantile, business, industrial, or storage use
(2)* Nonresidential use with an occupant load fewer than that established by Section 6.1 for the occupancy threshold

6.1.14.2 Definitions.

6.1.14.2.1 Multiple Occupancy. A building or structure in which two or more classes of occupancy exist.

6.1.14.2.2 Mixed Occupancy. A multiple occupancy where the occupancies are intermingled.

6.1.14.2.3 Separated Occupancy. A multiple occupancy where the occupancies are separated by fire barriers.

6.1.14.3 Mixed Occupancies.

6.1.14.3.1 Each portion of the building shall be classified as to its use in accordance with Section 6.1.

6.1.14.3.2* The building shall comply with the most restrictive requirements of the occupancies involved, unless separate safeguards are approved.

6.1.14.4 Separated Occupancies. *(See also 6.1.14.1.2.)*

6.1.14.4.1 Where separated occupancies are provided, each part of the building comprising a distinct occupancy, as described in this chapter, shall be completely separated from other occupancies by fire barriers, as specified in Table 6.1.14.4.1(a), Table 6.1.14.4.1(b), and 6.1.14.4.2 through 6.1.14.4.4, unless separation is provided by approved existing separations or as otherwise permitted by 6.1.14.4.6.

6.1.14.4.2 Occupancy separation fire barriers shall be classified as 3-hour fire-resistance-rated, 2-hour fire-resistance-rated, or 1-hour fire-resistance-rated and shall meet the requirements of Chapter 8.

6.1.14.4.3 The fire barrier minimum fire resistance rating specified in Table 6.1.14.4.1(a) and Table 6.1.14.4.1(b) shall be permitted to be reduced by 1 hour, but in no case shall it be reduced to less than 1 hour, where the building is protected throughout by an approved automatic sprinkler system in accordance with 9.7.1.1(1) and supervised in accordance with 9.7.2, unless prohibited by the double-dagger footnote entries in the tables.

6.1.14.4.4 Occupancy separation fire barriers shall be vertical, horizontal, or both or, when necessary, of such other form as required to provide complete separation between occupancy divisions in the building.

6.1.14.4.5* Each separated portion of the building shall comply with the requirements for the occupancy therein.

6.1.14.4.6 Where permitted in Chapters 11 through 43, atrium walls shall be permitted to serve as part of the separation required by 6.1.14.4.1 for creating separated occupancies on a story-by-story basis, provided all of the following are met:

(1) The atrium is separated from adjacent areas by walls that are smoke partitions in accordance with Section 8.4.
(2) Doors in the smoke partitions required by 6.1.14.4.6(1) are equipped with positive latching hardware.
(3) The atrium meets the provisions of 8.6.7 that are applicable to new atriums.

6.2 Hazard of Contents.

6.2.1 General.

6.2.1.1 For the purpose of this *Code*, the hazard of contents shall be the relative danger of the start and spread of fire, the danger of smoke or gases generated, and the danger of explosion or other occurrence potentially endangering the lives and safety of the occupants of the building or structure.

6.2.1.2 Hazard of contents shall be classified by the registered design professional (RDP) or owner and submitted to the authority having jurisdiction for review and approval on the basis of the character of the contents and the processes or operations conducted in the building or structure.

6.2.1.3* For the purpose of this *Code*, where different degrees of hazard of contents exist in different parts of a building or structure, the most hazardous shall govern the classification, unless hazardous areas are separated or protected as specified in Section 8.7 and the applicable sections of Chapters 11 through 43.

6.2.2 Classification of Hazard of Contents.

6.2.2.1* General. The hazard of contents of any building or structure shall be classified as low, ordinary, or high in accordance with 6.2.2.2, 6.2.2.3, and 6.2.2.4.

6.2.2.2* Low Hazard Contents. Low hazard contents shall be classified as those of such low combustibility that no self-propagating fire therein can occur.

6.2.2.3* Ordinary Hazard Contents. Ordinary hazard contents shall be classified as those that are likely to burn with moderate rapidity or to give off a considerable volume of smoke.

6.2.2.4* High Hazard Contents. High hazard contents shall be classified as those that are likely to burn with extreme rapidity or from which explosions are likely. *(For means of egress requirements, see Section 7.11.)*

Table 6.1.14.4.1(a) Required Separation of Occupancies (hours),* Part 1

Occupancy	Assembly ≤300	Assembly >300 to ≤1000	Assembly >1000	Educational	Day-Care >12 Clients	Day-Care Homes	Health Care	Ambulatory Health Care	Detention & Correctional	One- & Two-Family Dwellings	Lodging or Rooming Houses	Hotels & Dormitories
Assembly ≤ 300	—	0	0	2	2	1	2†	2	2†	2	2	2
Assembly >300 to ≤1000	0	—	0	2	2	2	2†	2	2†	2	2	2
Assembly >1000	0	0	—	2	2	2	2†	2	2†	2	2	2
Educational	2	2	2	—	2	2	2†	2	2†	2	2	2
Day-Care >12 Clients	2	2	2	2	—	1	2†	2	2†	2	2	2
Day-Care Homes	1	2	2	2	1	—	2†	2	2†	2	2	2
Health Care	2†	2†	2†	2†	2†	2†	—	2†	2†	2†	2†	2†
Ambulatory Health Care	2	2	2	2	2	2	2†	—	2†	2	2	2
Detention & Correctional	2†	2†	2†	2†	2†	2†	2†	2†	—	2†	2†	2†
One- & Two-Family Dwellings	2	2	2	2	2	2	2†	2	2†	—	1	1
Lodging or Rooming Houses	2	2	2	2	2	2	2†	2	2†	1	—	1
Hotels & Dormitories	2	2	2	2	2	2	2†	2	2†	1	1	—
Apartment Buildings	2	2	2	2	2	2	2†	2	2†	1	1	1
Board & Care, Small	2	2	2	2	2	2	2†	2	2†	1	2	2
Board & Care, Large	2	2	2	2	2	2	2†	2	2†	2	2	2
Mercantile	2	2	2	2	2	2	2†	2	2†	2	2	2
Mercantile, Mall	2	2	2	2	2	2	2†	2	2†	2	2	2
Mercantile, Bulk Retail	3	3	3	3	3	3	2†	2†	2†	3	3	3
Business	1	2	2	2	2	2	2†	1	2†	2	2	2
Industrial, General Purpose	2	2	3	3	3	3	2†	2	2†	2	2	2
Industrial, Special-Purpose	2	2	2	3	3	3	2†	2	2†	2	2	2
Industrial, High Hazard	3	3	3	3	3	3	2†	2†	NP	3	3	3
Storage, Low & Ordinary Hazard	2	2	3	3	3	2	2†	2	2†	2	2	2
Storage, High Hazard	3	3	3	3	3	3	2†	2†	NP	3	3	3

NP: Not permitted.

**Minimum Fire Resistance Rating*. The fire resistance rating is permitted to be reduced by 1 hour, but in no case to less than 1 hour, where the building is protected throughout by an approved automatic sprinkler system in accordance with 9.7.1.1(1) and supervised in accordance with 9.7.2.

†The 1-hour reduction due to the presence of sprinklers in accordance with the asterisk footnote is not permitted.

Table 6.1.14.4.1(b) Required Separation of Occupancies (hours)*, Part 2

Occupancy	Apartment Buildings	Board & Care, Small	Board & Care, Large	Mercantile	Mercantile, Mall	Mercantile, Bulk Retail	Business	Industrial, General Purpose	Industrial, Special Purpose	Industrial, High Hazard	Storage, Low & Ordinary Hazard	Storage, High Hazard
Assembly ≤ 300	2	2	2	2	2	3	1	2	2	3	2	3
Assembly >300 to ≤1000	2	2	2	2	2	3	2	2	2	3	2	3
Assembly >1000	2	2	2	2	2	3	2	3	2	3	3	3
Educational	2	2	2	2	2	3	2	3	3	3	3	3
Day-Care >12 Clients	2	2	2	2	2	3	2	3	3	3	3	3
Day-Care Homes	2	2	2	2	2	3	2	3	3	3	2	3
Health Care	2†	2†	2†	2†	2†	2†	2†	2†	2†	2†	2†	2†
Ambulatory Health Care	2	2	2	2	2	2†	1	2	2	2†	2	2†
Detention & Correctional	2†	2†	2†	2†	2†	2†	2†	2†	2†	NP	2†	NP
One- & Two-Family Dwellings	1	1	2	2	2	3	2	2	2	3	2	3
Lodging or Rooming Houses	1	2	2	2	2	3	2	2	2	3	2	3
Hotels & Dormitories	1	2	2	2	2	3	2	2	2	3	2	3
Apartment Buildings	—	2	2	2	2	3	2	2	2	3	2	3
Board & Care, Small	2	—	1	2	2	3	2	3	3	3	3	3
Board & Care, Large	2	1	—	2	2	3	2	3	3	3	3	3
Mercantile	2	2	2	—	0	3	2	2	2	3	2	3
Mercantile, Mall	2	2	2	0	—	3	2	3	3	3	2	3
Mercantile, Bulk Retail	3	3	3	3	3	—	2	2	2	3	2	2
Business	2	2	2	2	2	2	—	2	2	2	2	2
Industrial, General Purpose	2	3	3	2	3	2	2	—	1	1	1	1
Industrial, Special-Purpose	2	3	3	2	3	2	2	1	—	1	1	1
Industrial, High Hazard	3	3	3	3	3	3	2	1	1	—	1	1
Storage, Low & Ordinary Hazard	2	3	3	2	2	2	2	1	1	1	—	1
Storage, High Hazard	3	3	3	3	3	2	2	1	1	1	1	—

NP: Not permitted.

**Minimum Fire Resistance Rating.* The fire resistance rating is permitted to be reduced by 1 hour, but in no case to less than 1 hour, where the building is protected throughout by an approved automatic sprinkler system in accordance with 9.7.1.1(1) and supervised in accordance with 9.7.2.

†The 1-hour reduction due to the presence of sprinklers in accordance with the asterisk footnote is not permitted.

Chapter 7 Means of Egress

7.1 General.

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

7.1.2 Definitions.

7.1.2.1 General. For definitions, see Chapter 3.

7.1.2.2 Special Definitions. The following is a list of special terms used in this chapter:

(1) **Accessible Area of Refuge.** See 3.3.25.1.
(2) **Accessible Means of Egress.** See 3.3.185.1.
(3) **Area of Refuge.** See 3.3.25.
(4) **Common Path of Travel.** See 3.3.49.
(5) **Electroluminescent.** See 3.3.72.
(6) **Elevator Evacuation System.** See 3.3.73.
(7) **Elevator Lobby.** See 3.3.74.
(8) **Elevator Lobby Door.** See 3.3.66.1.
(9) **Exit.** See 3.3.88.
(10) **Exit Access.** See 3.3.89.
(11) **Exit Discharge.** See 3.3.90.
(12) **Externally Illuminated.** See 3.3.158.1.
(13) **Fire Exit Hardware.** See 3.3.143.1.
(14) **Horizontal Exit.** See 3.3.88.1.
(15) **Internally Illuminated.** See 3.3.158.2.
(16) **Means of Egress.** See 3.3.185.
(17) **Panic Hardware.** See 3.3.143.2.
(18) **Photoluminescent.** See 3.3.224.
(19) **Ramp.** See 3.3.238.
(20) **Self-Luminous.** See 3.3.259.
(21) **Severe Mobility Impairment.** See 3.3.265.
(22) **Smokeproof Enclosure.** See 3.3.277.

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

7.1.3.1 Exit Access Corridors. Corridors used as exit access and serving an area having an occupant load exceeding 30 shall be separated from other parts of the building by walls having not less than a 1-hour fire resistance rating in accordance with Section 8.3, unless otherwise permitted by one of the following:

(1) This requirement shall not apply to existing buildings, provided that the occupancy classification does not change.
(2) This requirement shall not apply where otherwise provided in Chapters 11 through 43.

7.1.3.2 Exits.

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

(1)* The separation shall have a minimum 1-hour fire resistance rating where the exit connects three or fewer stories.
(2) The separation specified in 7.1.3.2.1(1), other than an existing separation, shall be supported by construction having not less than a 1-hour fire resistance rating.
(3)* The separation shall have a minimum 2-hour fire resistance rating where the exit connects four or more stories, unless one of the following conditions exists:

(a) In existing non-high-rise buildings, existing exit stair enclosures shall have a minimum 1-hour fire resistance rating.
(b) In existing buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, existing exit stair enclosures shall have a minimum 1-hour fire resistance rating.
(c) The minimum 1-hour enclosures in accordance with 28.2.2.1.2, 29.2.2.1.2, 30.2.2.1.2, and 31.2.2.1.2 shall be permitted as an alternative to the requirement of 7.1.3.2.1(3).

(4) The minimum 2-hour fire-resistance-rated separation required by 7.1.3.2.1(3) shall be constructed of an assembly of noncombustible or limited-combustible materials and shall be supported by construction having a minimum 2-hour fire resistance rating, unless otherwise permitted by 7.1.3.2.1(6).
(5)* Structural elements, or portions thereof, that support exit components and either penetrate into a fire-resistance-rated assembly or are installed within a fire-resistance-rated wall assembly shall be protected, as a minimum, to the fire resistance rating required by 7.1.3.2.1(1) or 7.1.3.2.1(3).
(6) Fire-retardant-treated wood enclosed in noncombustible or limited-combustible materials shall be permitted in accordance with NFPA 220.
(7) Openings in the separation shall be protected by fire door assemblies equipped with door closers complying with 7.2.1.8.
(8)* Openings in exit enclosures shall be limited to door assemblies from normally occupied spaces and corridors and door assemblies for egress from the enclosure, unless one of the following conditions exists:

(a) Vestibules that separate normally unoccupied spaces from an exit enclosure shall be permitted, provided the vestibule is separated from adjacent spaces by corridor walls and related opening protectives as required for the occupancy involved but not less than a smoke partition in accordance with Section 8.4.
(b) In buildings of Type I or Type II construction, as defined in NFPA 220 *(see 8.2.1.2)*, fire-protection-rated door assemblies to normally unoccupied building service equipment support areas as addressed in Section 7.14 shall be permitted, provided the space is separated from the exit enclosure by fire barriers as required by 7.1.3.2.1(3).
(c) Openings in exit passageways in mall buildings as provided in Chapters 36 and 37 shall be permitted.
(d) In buildings of Type I or Type II construction, as defined in NFPA 220 *(see 8.2.1.2)*, existing fire-protection-rated door assemblies to interstitial spaces shall be permitted, provided that such spaces meet all of the following criteria:

i. The space is used solely for distribution of pipes, ducts, and conduits.
ii. The space contains no storage.
iii. The space is separated from the exit enclosure in accordance with Section 8.3.

(e) Existing openings to mechanical equipment spaces protected by approved existing fire-protection-rated door assemblies shall be permitted, provided that the following criteria are met:

i. The space is used solely for non-fuel-fired mechanical equipment.
ii. The space contains no storage of combustible materials.
iii. The building is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7 or the mechanical equipment space is provided with sprinkler protection in accordance with Section 9.7 and provided with complete smoke detection in accordance with Section 9.6.

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

(a) Door assemblies permitted by 7.1.3.2.1(8)
(b)* Electrical conduit serving the exit enclosure
(c) Pathways for devices for security and communication systems serving the exit enclosure, where pathways are installed in metal conduit
(d)* Required exit door openings
(e) Ductwork and equipment necessary for independent stair pressurization
(f) Water or steam piping necessary for the heating or cooling of the exit enclosure
(g) Sprinkler piping
(h) Standpipes
(i) Existing penetrations
(j) Penetrations for fire alarm circuits, where the circuits are installed in metal conduit

(10) Penetrations or communicating openings shall be prohibited between adjacent exit enclosures.
(11) All penetrations in fire barriers separating the exit from other parts of the building shall be protected in accordance with 8.3.4.
(12) Membrane penetrations shall be permitted on the exit access side of the exit enclosure and shall be protected in accordance with 8.3.4.7.

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

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

7.1.4 Interior Finish in Exit Enclosures.

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

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

7.1.5* Headroom.

7.1.5.1 Means of egress shall be designed and maintained to provide headroom in accordance with other sections of this *Code*, and such headroom shall be not less than 7 ft 6 in. (2285 mm). Projections from the ceiling shall provide headroom of not less than 6 ft 8 in. (2030 mm), with a tolerance of –¾ in. (–19 mm), above the finished floor, unless otherwise specified by any of the following:

(1) In existing buildings, the ceiling height shall be not less than 7 ft (2135 mm) from the floor, with projections from the ceiling not less than 6 ft 8 in. (2030 mm), with a tolerance of –¾ in. (–19 mm), above the floor.
(2) Headroom in industrial equipment access areas as provided in 40.2.5.3 shall be permitted.

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

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

7.1.6 Walking Surfaces in the Means of Egress.

7.1.6.1 General.

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

7.1.6.1.2 Approved existing walking surfaces shall be permitted.

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

7.1.6.3 Level.

7.1.6.3.1 Walking surfaces shall comply with all of the following:

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

7.1.6.3.2 Vehicle ramps in parking structures, as permitted in 42.8.2.2.6, and not on an accessible means of egress or other accessible element, shall be exempt from the provisions of 7.1.6.3.1.

7.1.6.4* Slip Resistance. Walking surfaces in the means of egress shall be slip resistant under foreseeable conditions.

7.1.7 Changes in Level in Means of Egress.

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

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

7.1.7.2.1 Where a ramp is used to meet the requirements of 7.1.7.2, the presence and location of ramped portions of walkways shall be readily apparent.

7.1.7.2.2 Where a stair is used to meet the requirements of 7.1.7.2, the tread depth of such stair shall be not less than 13 in. (330 mm).

7.1.7.2.3 Tread depth in industrial equipment access areas as provided in 40.2.5.3 shall be permitted.

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

7.1.8* Guards. Guards in accordance with 7.2.2.4 shall be provided at the open sides of means of egress that exceed 30 in. (760 mm) above the floor or the finished ground level below except where guards are specifically exempted by provisions of Chapters 11 through 43.

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

7.1.10 Means of Egress Reliability.

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

7.1.10.2 Furnishings and Decorations in Means of Egress.

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

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

7.1.10.2.3 Mirrors shall not be placed on exit door leaves. Mirrors shall not be placed in or adjacent to any exit in such a manner as to confuse the direction of egress.

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

7.2 Means of Egress Components.

7.2.1 Door Openings.

7.2.1.1 General.

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

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

7.2.1.1.3 Occupied Building.

7.2.1.1.3.1 For the purposes of Section 7.2, a building shall be considered to be occupied at any time it meets any of the following criteria:

(1) It is open for general occupancy.
(2) It is open to the public.
(3) It is occupied by more than 10 persons.

7.2.1.1.3.2 Where means of egress doors are locked in a building that is not considered occupied, occupants shall not be locked beyond their control in buildings or building spaces, except for lockups in accordance with 22.4.6 and 23.4.6, detention and correctional occupancies, and health care occupancies.

7.2.1.2 Door Leaf Width.

7.2.1.2.1* Measurement of Clear Width.

7.2.1.2.1.1 Swinging Door Assemblies. For swinging door assemblies, clear width shall be measured as follows:

(1) The measurement shall be taken at the narrowest point in the door opening.
(2) The measurement shall be taken between the face of the door leaf and the stop of the frame.
(3) For new swinging door assemblies, the measurement shall be taken with the door leaf open 90 degrees.
(4) For any existing door assembly, the measurement shall be taken with the door leaf in the fully open position.
(5) Projections of not more than 4 in. (100 mm) into the door opening width on the hinge side shall not be considered reductions in clear width, provided that such projections are for purposes of accommodating panic hardware or fire exit hardware and are located not less than 34 in. (865 mm), and not more than 48 in. (1220 mm), above the floor.
(6) Projections exceeding 6 ft 8 in. (2030 mm) above the floor shall not be considered reductions in clear width.

7.2.1.2.1.2 Other than Swinging Door Assemblies. For other than swinging door assemblies, clear width shall be measured as follows:

(1) The measurement shall be taken at the narrowest point in the door opening.
(2) The measurement shall be taken as the door opening width when the door leaf is in the fully open position.
(3) Projections exceeding 6 ft 8 in. (2030 mm) above the floor shall not be considered reductions in clear width.

7.2.1.2.2* Measurement of Egress Capacity Width.

7.2.1.2.2.1 Swinging Door Assemblies. For swinging door assemblies, egress capacity width shall be measured as follows:

(1) The measurement shall be taken at the narrowest point in the door opening.
(2) The measurement shall be taken between the face of the door leaf and the stop of the frame.

(3) For new swinging doors assemblies, the measurement shall be taken with the door leaf open 90 degrees.
(4) For any existing door assembly, the measurement shall be taken with the door leaf in the fully open position.
(5) Projections not more than 3½ in. (90 mm) at each side of the door openings at a height of not more than 38 in. (965 mm) shall not be considered reductions in egress capacity width.
(6) Projections exceeding 6 ft 8 in. (2030 mm) above the floor shall not be considered reductions in egress capacity width.

7.2.1.2.2.2 Other than Swinging Door Assemblies. For other than swinging door assemblies, egress capacity width shall be measured as follows:

(1) The measurement shall be taken at the narrowest point in the door opening.
(2) The measurement shall be taken as the door opening width when the door leaf is in the fully open position.
(3) Projections not more than 3½ in. (90 mm) at each side of the door openings at a height of not more than 38 in. (965 mm) shall not be considered reductions in egress capacity width.
(4) Projections exceeding 6 ft 8 in. (2030 mm) above the floor shall not be considered reductions in egress capacity width.

7.2.1.2.3 Minimum Door Leaf Width.

7.2.1.2.3.1 For purposes of determining minimum door opening width, the clear width in accordance with 7.2.1.2.1 shall be used, unless door leaf width is specified.

7.2.1.2.3.2 Door openings in means of egress shall be not less than 32 in. (810 mm) in clear width, except under any of the following conditions:

(1) Where a pair of door leaves is provided, one door leaf shall provide not less than a 32 in. (810 mm) clear width opening.
(2)* Exit access door assemblies serving a room not exceeding 70 ft^2 (6.5 m^2) and not required to be accessible to persons with severe mobility impairments shall be not less than 24 in. (610 mm) in door leaf width.
(3)* Door openings serving a building or portion thereof not required to be accessible to persons with severe mobility impairments shall be permitted to be 28 in. (710 mm) in door leaf width.
(4) In existing buildings, the existing door leaf width shall be not less than 28 in. (710 mm).
(5) Door openings in detention and correctional occupancies, as otherwise provided in Chapters 22 and 23, shall not be required to comply with 7.2.1.2.3.
(6) Interior door openings in dwelling units as otherwise provided in Chapter 24 shall not be required to comply with 7.2.1.2.3.
(7) The door leaves located within a two-leaf opening where both leaves open and close as a power-operated pair shall be exempt from the minimum 32 in. (810 mm) single-leaf requirement in accordance with 7.2.1.9.1.8.
(8) Revolving door assemblies, as provided in 7.2.1.10, shall be exempt from the minimum 32 in. (810 mm) width requirement.
(9)* Where a single door opening is provided for discharge from a stairway required to be a minimum of 56 in. (1420 mm) wide in accordance with 7.2.2.2.1.2(B), and such door assembly serves as the sole means of exit discharge from such stairway, the clear width of the door opening, measured in accordance with 7.2.1.2.2, shall be not less than two-thirds the required width of the stairway.

7.2.1.3 Floor Level.

7.2.1.3.1 The elevation of the floor surfaces on both sides of a door opening shall not vary by more than ½ in. (13 mm), unless otherwise permitted by 7.2.1.3.5, 7.2.1.3.6, or 7.2.1.3.7.

7.2.1.3.2 The elevation of the floor surfaces required by 7.2.1.3.1 shall be maintained on both sides of the door openings for a distance not less than the width of the widest leaf and, for other than existing installations, not less than 36 in. (915 mm).

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

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

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

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

7.2.1.3.7 Where doors serve spaces that are not normally occupied, the floor level shall be permitted to be lower than that of the door opening but shall be not more than 8 in. (205 mm) lower.

7.2.1.4 Swing and Force to Open.

7.2.1.4.1* Swinging-Type Door Assembly Requirement. Any door assembly in a means of egress shall be of the side-hinged or pivoted-swinging type, and shall be installed to be capable of swinging from any position to the full required width of the opening in which it is installed, unless otherwise specified as follows:

(1) Door assemblies in dwelling units, as provided in Chapter 24, shall be permitted.
(2) Door assemblies in residential board and care occupancies, as provided in Chapters 32 and 33, shall be permitted.
(3) Horizontal-sliding or vertical-rolling security grilles or door assemblies that are part of the required means of egress, where permitted in Chapters 11 through 43, shall be permitted, provided that all of the following criteria are met:
    (a) Such grilles or door assemblies shall remain secured in the fully open position during the period of occupancy by the general public.
    (b) On or adjacent to the grille or door opening, there shall be a readily visible, durable sign in letters not less than 1 in. (25 mm) high on a contrasting background that reads as follows: THIS DOOR TO REMAIN OPEN WHEN THE SPACE IS OCCUPIED.

(c) Door leaves or grilles shall not be brought to the closed position when the space is occupied.
(d) Door leaves or grilles shall be operable from within the space without the use of any special knowledge or effort.
(e) Where two or more means of egress are required, not more than half of the means of egress shall be equipped with horizontal-sliding or vertical-rolling grilles or door assemblies.

(4) Horizontal-sliding door assemblies shall be permitted under any of the following conditions:

(a) Horizontal-sliding door assemblies in detention and correctional occupancies, as provided in Chapters 22 and 23, shall be permitted.
(b) Special-purpose horizontally sliding accordion or folding door assemblies complying with 7.2.1.13 shall be permitted.
(c) Unless prohibited by Chapters 11 through 43, horizontal-sliding door assemblies serving a room or area with an occupant load of fewer than 10 shall be permitted, provided that all of the following criteria are met:

i. The area served by the door assembly has no high-hazard contents.
ii. The door assembly is readily operable from either side without special knowledge or effort.
iii. The force required to operate the door assembly in the direction of door leaf travel is not more than 30 lbf (133 N) to set the door leaf in motion and is not more than 15 lbf (67 N) to close the door assembly or open it to the minimum required width.
iv. The door assembly complies with any required fire protection rating, and, where rated, is self-closing or automatic-closing by means of smoke detection in accordance with 7.2.1.8 and is installed in accordance with NFPA 80.
v. Corridor door assemblies required to be self-latching have a latch or other mechanism that ensures that the door leaf will not rebound into a partially open position if forcefully closed.

(d) Where private garages, business areas, industrial areas, and storage areas with an occupant load not exceeding 10 contain only low- or ordinary-hazard contents, door openings to such areas and private garages shall be permitted to be horizontal-sliding door assemblies.

(5) Vertical-rolling door assemblies shall be permitted in door openings to private garages, business areas, industrial areas, and storage areas where such areas have an occupant load not exceeding 10 and contain only low or ordinary hazard contents.
(6) Revolving door assemblies complying with 7.2.1.10 shall be permitted.
(7) Existing fusible-link-operated horizontal-sliding or vertical-rolling fire door assemblies shall be permitted to be used as provided in Chapters 39, 40, and 42.

7.2.1.4.2* Door Leaf Swing Direction. Door leaves required to be of the side-hinged or pivoted-swinging type shall swing in the direction of egress travel under any of the following conditions:

(1) Where serving a room or area with an occupant load of 50 or more, except under any of the following conditions:

(a) Door leaves in horizontal exits shall not be required to swing in the direction of egress travel where permitted by 7.2.4.3.8.1 or 7.2.4.3.8.2.
(b) Door leaves in smoke barriers shall not be required to swing in the direction of egress travel in existing health care occupancies, as provided in Chapter 19.

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

7.2.1.4.3* Door Leaf Encroachment.

7.2.1.4.3.1 During its swing, any door leaf in a means of egress shall leave not less than one-half of the required width of an aisle, a corridor, a passageway, or a landing unobstructed, unless both of the following conditions are met:

(1) The door opening provides access to a stair in an existing building.
(2) The door opening meets the requirement of 7.2.1.4.3.2.

7.2.1.4.3.2 When fully open, any door leaf in a means of egress shall not project more than 7 in. (180 mm) into the required width of an aisle, a corridor, a passageway, or a landing, unless the door leaf is equipped with an approved self-closing device and is not required by the provisions of 7.2.1.4.2 to swing in the direction of egress travel.

7.2.1.4.3.3 Surface-mounted latch release hardware on the door leaf shall be exempt from being included in the maximum 7 in. (180 mm) projection requirement of 7.2.1.4.3.2, provided that both of the following criteria are met:

(1) The hardware is mounted to the side of the door leaf that faces the aisle, corridor, passageway, or landing when the door leaf is in the open position.
(2) The hardware is mounted not less than 34 in. (865 mm), and not more than 48 in. (1220 mm), above the floor.

7.2.1.4.4 Screen Door Assemblies and Storm Door Assemblies. Screen door assemblies and storm door assemblies used in a means of egress shall be subject to the requirements for direction of swing that are applicable to other door assemblies used in a means of egress.

7.2.1.4.5 Door Unlatching and Leaf Operating Forces.

7.2.1.4.5.1 The forces required to fully unlock and unlatch any door leaf manually in a means of egress shall not exceed 15 lbf (67 N) where the door hardware operates by push, pull, or slide, or 28 in.-lbf (3.16 N-m) where the door hardware operates by rotation.

7.2.1.4.5.2 The forces required to fully open any door leaf manually in a means of egress shall not exceed 30 lbf (133 N) to set the leaf in motion, and 15 lbf (67 N) to open the leaf to the minimum required width, unless otherwise specified as follows:

(1) The door opening forces for interior side-hinged or pivoted-swinging door leaves without closers shall not exceed 5 lbf (22 N).
(2) The door opening forces for existing door leaves in existing buildings shall not exceed 50 lbf (222 N) applied to the latch stile.

(3) The door opening forces for horizontal-sliding door leaves in detention and correctional occupancies shall be as provided in Chapters 22 and 23.
(4) The opening forces for power-operated door leaves shall be as provided in 7.2.1.9.

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

7.2.1.5 Locks and Latches.

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

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

7.2.1.5.3* Latch-Release Devices. All locks, latches, and all other fastening devices on a door leaf shall be provided with a releasing device on the egress side of the door that has an obvious method of operation and that is readily operated under all lighting conditions.

7.2.1.5.3.1 The releasing mechanism for locks and latches shall be located as follows:

(1) Not less than 34 in. (865 mm) above the finished floor for other than existing installations
(2) Not more than 48 in. (1220 mm) above the finished floor

7.2.1.5.3.2* The operation of the releasing mechanism shall release all latching and all locking devices of the door leaf with not more than one motion in a single linear or rotational direction, unless otherwise specified in 7.2.1.5.3.4, 7.2.1.5.3.5, 7.2.1.5.3.7, or 7.2.1.5.3.8.

7.2.1.5.3.3 The releasing mechanism for new installations shall be capable of being operated with one hand and shall not require tight grasping, tight pinching, or twisting of the wrist to operate.

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

7.2.1.5.3.5 Existing security devices permitted by 7.2.1.5.3.4 shall be permitted to have two additional releasing motions.

7.2.1.5.3.6 Existing security devices permitted by 7.2.1.5.3.4, other than automatic latching devices, shall be located not more than 60 in. (1525 mm) above the finished floor.

7.2.1.5.3.7* Two releasing motions shall be permitted for existing hardware on a door leaf serving an area having an occupant load not exceeding three, provided that releasing does not require simultaneous operations.

7.2.1.5.3.8 Two releasing motions shall be permitted in existing educational occupancies in accordance with 15.2.2.2.4 and in existing day care occupancies in accordance with 17.2.2.2.6.

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

7.2.1.5.5* The requirement of 7.2.1.5.1 shall not apply to door leaves of listed fire door assemblies after exposure to elevated temperature in accordance with the listing, based on laboratory fire test procedures.

7.2.1.5.6 Key-Operated Locks.

7.2.1.5.6.1 Where permitted in Chapters 11 through 43, key operation shall be permitted, provided that the key cannot be removed when the door leaf is locked from the side from which egress is to be made.

7.2.1.5.6.2* Exterior door assemblies and interior door assemblies to an individual tenant space or to a single tenant space shall be permitted to have key-operated locks from the egress side, provided that all of the following criteria are met:

(1) This alternative is permitted in Chapters 11 through 43 for the specific occupancy.
(2) Doors remain unlocked when the building or space is occupied.
(3) Doors are marked with a readily visible, durable sign in letters not less than 1 in. (25 mm) high on a contrasting background that reads as follows and is located on or adjacent to the door leaf: THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED, or THIS DOOR TO REMAIN UNLOCKED WHEN THE BUILDING IS OCCUPIED, as applicable.
(4) The locking device is of a type that is readily distinguishable as locked.
(5) A key is immediately available to any occupant inside the building when it is locked.

7.2.1.5.6.3 The alternative provisions of 7.2.1.5.6.2 shall be permitted to be revoked by the authority having jurisdiction for cause.

Δ **7.2.1.5.7* Stair Enclosure Re-entry.** Every door assembly in a stair enclosure serving more than four stories, unless permitted by 7.2.1.5.7.2, shall meet one of the following conditions:

(1) Re-entry from the stair enclosure to the interior of the building shall be provided.
(2) An automatic release shall be provided that meets all of the following:
   (a) The automatic release shall unlock all stair enclosure door assemblies to allow re-entry.
   (b) The automatic release shall be actuated with the initiation of the building fire alarm system.
   (c)* Door electromechanical or electromagnetic locking hardware for new installations shall be listed in accordance with UL 294, *Access Control System Units*, or UL 1034, *Burglary-Resistant Electric Locking Mechanisms*.
(3) Selected re-entry shall be provided in accordance with 7.2.1.5.7.1.

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

(1) There shall be not less than two levels where it is possible to leave the stair enclosure to access another exit.
(2) There shall be not more than four stories intervening between stories where it is possible to leave the stair enclosure to access another exit.

(3) Re-entry shall be possible on the top story or next-to-top story served by the stair enclosure, and such story shall allow access to another exit.
(4) Door assemblies allowing re-entry shall be identified as such on the stair side of the door leaf.
(5) Door assemblies not allowing re-entry shall be provided with a sign on the stair side indicating the location of the nearest door opening, in each direction of travel, that allows re-entry or exit.

7.2.1.5.7.2 The requirements of 7.2.1.5.7, except as provided in 7.2.1.5.7.3, shall not apply to the following:

(1) Existing installations in buildings that are not high-rise buildings as permitted in Chapters 11 through 43
(2) Existing installations in high-rise buildings as permitted in Chapters 11 through 43 where the occupancy is within a building protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7
(3) Existing approved stairwell re-entry installations as permitted by Chapters 11 through 43
(4) Stair enclosures serving a building permitted to have a single exit in accordance with Chapters 11 through 43
(5) Stair enclosures in health care occupancies where otherwise provided in Chapter 18
(6) Stair enclosures in detention and correctional occupancies where otherwise provided in Chapter 22

7.2.1.5.7.3 When the provisions of 7.2.1.5.7.2 are used, signage on the stair door leaves shall be required as follows:

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

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

7.2.1.5.9 Where pairs of door leaves are required in a means of egress, one of the following criteria shall be met:

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

7.2.1.5.10* On doors required to release all latching and all locking devices of the door leaf with not more than one releasing motion in accordance with 7.2.1.5.3.2, devices shall not be installed in connection with any door assembly where such devices prevent or are intended to prevent the free use of the leaf for purposes of egress, unless otherwise provided in 7.2.1.6.

7.2.1.6* Special Locking Arrangements.

7.2.1.6.1* Delayed-Egress Electrical Locking Systems.

Δ **7.2.1.6.1.1** Approved, delayed-egress electrical locking systems shall be permitted to be installed on door assemblies serving low- and ordinary-hazard contents in buildings protected throughout by an approved, supervised automatic fire detection system in accordance with Section 9.6 or an approved, supervised automatic sprinkler system in accordance with Section 9.7, and where permitted in Chapters 11 through 43, provided that all of the following criteria are met:

(1) The delay of the delayed-egress electrical locking system shall deactivate allowing unobstructed egress upon actuation of one of the following:
   (a) Approved, supervised automatic sprinkler system in accordance with Section 9.7
   (b) Not more than one heat detector of an approved, supervised automatic fire detection system in accordance with Section 9.6
   (c) Not more than two smoke detectors of an approved, supervised automatic fire detection system in accordance with Section 9.6
(2) The delay of the delayed-egress electrical locking system shall deactivate allowing unobstructed egress upon loss of power controlling the lock or locking mechanism.
(3)* An irreversible process shall release the electrical lock in the direction of egress within 15 seconds, or 30 seconds where approved by the authority having jurisdiction, upon application of a force to the release device required in 7.2.1.5.3 under all of the following conditions:
   (a) The force shall not be required to exceed 15 lbf (67 N).
   (b) The force shall not be required to be continuously applied for more than 3 seconds.
   (c) The initiation of the release process shall activate an audible signal in the vicinity of the door opening.
   (d) Once the electrical lock has been released by the application of force to the releasing device, rearming the delay electronics shall be by manual means only.
(4)* A readily visible, durable sign that conforms to the visual characters requirements of ICC A117.1, *Accessible and Usable Buildings and Facilities*, shall be located on the door leaf adjacent to the release device in the direction of egress, and shall read as follows:
   (a) PUSH UNTIL ALARM SOUNDS, DOOR CAN BE OPENED IN 15 SECONDS, for doors that swing in the direction of egress travel
   (b) PULL UNTIL ALARM SOUNDS, DOOR CAN BE OPENED IN 15 SECONDS, for doors that swing against the direction of egress travel
(5) The egress side of doors equipped with delayed-egress electrical locking systems shall be provided with emergency lighting in accordance with Section 7.9.
(6)* Door electromechanical or electromagnetic locking hardware for new installations shall be listed in accordance with UL 294, *Access Control System Units*, or UL 1034, *Burglary-Resistant Electric Locking Mechanisms*.

7.2.1.6.1.2 The provisions of 7.2.1.6.2 for sensor-release of electrical locking systems and 7.2.1.6.3 for door hardware release of electrically locked egress door assemblies shall not apply to door assemblies with delayed-egress electrical locking systems.

7.2.1.6.2* Sensor-Release of Electrical Locking Systems.

Δ **7.2.1.6.2.1** Where permitted in Chapters 11 through 43, door assemblies in the means of egress shall be permitted to be equipped with sensor-release electrical locking system hardware provided that all of the following criteria are met:

(1) A sensor shall be provided on the egress side, arranged to electrically unlock the door leaf in the direction of egress upon detection of an approaching occupant.
(2) Door leaves shall automatically electrically unlock in the direction of egress upon loss of power to the sensor or to the part of the locking system that electrically locks the door leaves.
(3) Door locks shall be arranged to electrically unlock in the direction of egress from a manual release device complying with all of the following criteria:
   (a) The manual release device shall be located on the egress side, 40 in. to 48 in. (1015 mm to 1220 mm) vertically above the floor, and within 60 in. (1525 mm) of the secured door openings, except as otherwise permitted by 7.2.1.6.2.1(3)(b).
   (b) The requirement of 7.2.1.6.2.1(3)(a) to locate the manual release device within 60 in. (1525 mm) of the secured door opening shall not apply to previously approved existing installations.
   (c) The manual release device shall be readily accessible and clearly identified by a sign that reads as follows: PUSH TO EXIT.
   (d) When operated, the manual release device shall result in direct interruption of power to the electrical lock — independent of the locking system electronics — and the lock shall remain unlocked for not less than 30 seconds.
(4) Activation of the building fire-protective signaling system, if provided, shall automatically electrically unlock the door leaves in the direction of egress, and the door leaves shall remain electrically unlocked until the fire-protective signaling system has been manually reset.
(5) The activation of manual fire alarm boxes that activate the building fire-protective signaling system specified in 7.2.1.6.2.1(4) shall not be required to unlock the door leaves.
(6) Activation of the building automatic sprinkler or fire detection system, if provided, shall automatically electrically unlock the door leaves in the direction of egress, and the door leaves shall remain electrically unlocked until the fire-protective signaling system has been manually reset.
(7) The egress side of sensor-release electrically locked egress doors, other than existing sensor-release electrically locked egress doors, shall be provided with emergency lighting in accordance with Section 7.9.
(8)* Door electromechanical or electromagnetic locking hardware for new installations shall be listed in accordance with UL 294, *Access Control System Units*, or UL 1034, *Burglary-Resistant Electric Locking Mechanisms*.

7.2.1.6.2.2 The provisions of 7.2.1.6.1 for delayed-egress electrical locking systems and 7.2.1.6.3 for door hardware release of electrically locked egress door assemblies shall not apply to door assemblies with sensor-release of electrical locking systems.

7.2.1.6.3 Door Hardware Release of Electrically Locked Egress Door Assemblies.

7.2.1.6.3.1 Door assemblies in the means of egress shall be permitted to be equipped with approved electrical locking systems released by the operation of door hardware provided that all of the following conditions are met:

(1) The hardware for egress-side occupant release of the electrical lock is affixed to the door leaf.
(2) The hardware has an obvious method of operation that is readily operated in the direction of egress under all lighting conditions.
(3) The hardware is capable of being operated with one hand in the direction of egress.
(4) Operation of the hardware directly and immediately interrupts the power supply to the electric lock to unlock the door assembly in the direction of egress.
(5)* Loss of power to the listed releasing hardware automatically unlocks the door assembly in the direction of egress.
(6)* Door electromechanical or electromagnetic locking hardware for new installations is listed in accordance with UL 294, *Access Control System Units*, or UL 1034, *Burglary-Resistant Electric Locking Mechanisms*.

7.2.1.6.3.2 The provisions of 7.2.1.6.1 for delayed-egress electrical locking systems and the provisions of 7.2.1.6.2 for sensor-release of electrical locking systems shall not apply to door assemblies with door hardware release of electrically locked egress doors.

7.2.1.6.4* Elevator Lobby Exit Access Door Assemblies Locking.

7.2.1.6.4.1 Where permitted in Chapters 11 through 43, door assemblies separating the elevator lobby from the exit access required by 7.4.1.6.1 shall be permitted to be electrically locked, provided that all the following criteria are met:

(1)* Door electromechanical or electromagnetic locking hardware is listed in accordance with UL 294, *Access Control System Units*, or UL 1034, *Burglary-Resistant Electric Locking Mechanisms*.
(2) The building is protected throughout by a fire alarm system in accordance with Section 9.6.
(3) The building is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.
(4) Waterflow in the sprinkler system required by 7.2.1.6.4.1 is arranged to initiate the building fire alarm system.
(5) The elevator lobby is protected by an approved, supervised smoke detection system in accordance with Section 9.6.
(6) Detection of smoke by the detection system required by 7.2.1.6.4.1 is arranged to initiate the building fire alarm system and notify building occupants.
(7) Initiation of the building fire alarm system by other than manual fire alarm boxes unlocks the electrical locks on the elevator lobby door assembly.
(8) Loss of power to the elevator lobby electrical lock system unlocks the electrical locks on the elevator lobby door assemblies.

(9) Once unlocked, the elevator lobby door assemblies remain electrically unlocked until the building fire alarm system has been manually reset.
(10) Where the elevator lobby door assemblies remain mechanically latched after being electrically unlocked, latch-releasing hardware in accordance with 7.2.1.5.3 is affixed to the door leaves.
(11) A two-way communication system is provided for communication between the elevator lobby and a central control point that is constantly staffed.
(12) The central control point staff required by 7.2.1.6.4.1(11) is capable, trained, and authorized to provide emergency assistance.

7.2.1.6.4.2 Elevator lobby exit access doors equipped with electrical locking systems shall not be required to comply with 7.2.1.6.1, 7.2.1.6.2, or 7.2.1.6.3.

7.2.1.7* Panic Hardware and Fire Exit Hardware.

7.2.1.7.1 Where a side-hinged door assembly, a pivoted-swinging door assembly, or a balanced door assembly is required to be equipped with panic or fire exit hardware, such hardware shall meet all of the following criteria:

(1) It shall consist of a cross bar or a push pad, with the length of the actuating portion of the cross bar or push pad extending not less than one-half of the width of the door leaf measured from the latch stile unless otherwise required by 7.2.1.7.2.
(2) It shall be mounted as follows:
  (a) New installations shall be not less than 34 in. (865 mm) and not more than 48 in. (1220 mm) above the floor.
  (b) Existing installations shall be not less than 30 in. (760 mm) and not more than 48 in. (1220 mm) above the floor.
(3) It shall be constructed so that a horizontal force not to exceed 15 lbf (66 N) actuates the cross bar or push pad and latches.

7.2.1.7.2 Where panic or fire exit hardware is installed on a balanced door assembly or pivoted-swinging door assembly, the panic or fire exit hardware shall be of the push-pad type, and the pad shall extend approximately one-half the width of the door leaf, measured from the latch stile.

7.2.1.7.3* Only approved fire exit hardware shall be used on fire-protection-rated door assemblies. New panic hardware and new fire exit hardware shall comply with UL 305, *Panic Hardware*, and ANSI/BHMA A156.3, *Exit Devices*.

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

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

7.2.1.8 Self-Closing Devices.

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

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

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

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

7.2.1.8.4 Delayed Action Closers. Doors required to be self-closing and not required to be automatic closing shall be permitted to be equipped with delayed action closers.

7.2.1.9* Powered Door Leaf Operation.

7.2.1.9.1* General. Where means of egress door leaves are operated by power by any automatic mechanism or are provided with power-assisted manual operation, the design shall be such that, in the event of power failure, the leaves open manually to allow egress travel or close when necessary to safeguard the means of egress.

7.2.1.9.1.1 New power-operated swinging doors, power-operated sliding doors, and power-operated folding doors shall comply with ANSI/BHMA A156.10, *Power Operated Pedestrian Doors*.

7.2.1.9.1.2 New power-assisted swinging doors and low-energy power-operated swinging doors shall comply with ANSI/BHMA A156.19, *Power Assist and Low Energy Power Operated Doors*.

7.2.1.9.1.3 New low-energy power-operated sliding doors and low-energy power-operated folding doors shall comply with ANSI/BHMA A156.38, *Low Energy Power Operated Sliding and Folding Doors*.

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

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

7.2.1.9.1.6 A readily visible, durable sign in letters not less than 1 in. (25 mm) high on a contrasting background that

reads as follows shall be located on the egress side of each door opening:

IN EMERGENCY, PUSH TO OPEN

7.2.1.9.1.7 Sliding, power-operated door assemblies in an exit access serving an occupant load of fewer than 50 that manually slide open in the direction of door leaf travel, with forces not exceeding those required in 7.2.1.4.5, shall not be required to have the swing-out feature required by 7.2.1.9.1.5. The required sign shall be in letters not less than 1 in. (25 mm) high on a contrasting background and shall read as follows:

IN EMERGENCY, SLIDE TO OPEN

7.2.1.9.1.8* In the emergency breakout mode, a door leaf located within a two-leaf opening shall be exempt from the minimum 32 in. (810 mm) single-leaf requirement of 7.2.1.2.3.2(1), provided that the clear width of the single leaf is not less than 30 in. (760 mm).

7.2.1.9.1.9 For a biparting sliding door assembly in the emergency breakout mode, a door leaf located within a multiple-leaf opening shall be exempt from the minimum 32 in. (810 mm) single-leaf requirement of 7.2.1.2.3.2(1) if a clear opening of not less than 32 in. (810 mm) is provided by all leafs broken out.

7.2.1.9.1.10 Door assemblies complying with 7.2.1.13 shall be permitted to be used.

7.2.1.9.1.11 The requirements of 7.2.1.9.1 through 7.2.1.9.1.10 shall not apply in detention and correctional occupancies where otherwise provided in Chapters 22 and 23.

7.2.1.9.2 Self-Closing or Self-Latching Door Leaf Operation. Where door leaves are required to be self-closing or self-latching and are operated by power by any automatic device, or are provided with power-assisted manual operation, they shall be permitted in the means of egress where they meet the following criteria:

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

7.2.1.10 Revolving Door Assemblies.

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

(1) New revolving doors shall comply with ANSI/BHMA A156.27, *Power and Manual Operated Revolving Pedestrian Doors*, and shall be installed in accordance with the manufacturer's installation instructions.
(2) Revolving door wings shall be capable of book-fold or breakout for egress in accordance with ANSI/BHMA A156.27, unless they are existing revolving doors approved by the authority having jurisdiction.
(3) When revolving door wings are collapsed into the book-fold position, the parallel egress paths formed shall provide an aggregate width of 36 in. (915 mm), unless they are approved existing revolving door assemblies.
(4) Revolving door assemblies shall not be used within 10 ft (3050 mm) of the foot or the top of stairs or escalators.
(5) A dispersal area acceptable to the authority having jurisdiction shall be located between stairs or escalators and the revolving door assembly.
(6) The revolutions per minute (rpm) of door wings shall not exceed the following:
    (a) The values in Table 7.2.1.10.1 for existing revolving doors.
    (b) The values in ANSI/BHMA A156.27 for new revolving doors.
(7) Each revolving door assembly shall have a conforming side-hinged swinging door assembly in the same wall as the revolving door within 10 ft (3050 mm) of the revolving door, unless one of the following conditions applies:
    (a) Revolving door assemblies shall be permitted without adjacent swinging door assemblies, as required by 7.2.1.10.1(6), in street floor elevator lobbies, provided that no stairways or door openings from other parts of the building discharge through the lobby and the lobby has no occupancy other than as a means of travel between the elevators and street.
    (b) The requirement of 7.2.1.10.1(6) shall not apply to existing revolving door assemblies where the number of revolving door assemblies does not exceed the number of swinging door assemblies within 20 ft (6100 mm) of the revolving door assembly.

7.2.1.10.2 Where permitted in Chapters 11 through 43, revolving door assemblies shall be permitted as a component in a means of egress, provided that all of the following criteria are met:

(1) Revolving door openings shall not be given credit for more than 50 percent of the required egress capacity.
(2) Each revolving door opening shall not be credited with more than a 50-person capacity or, if of not less than a 9 ft

Table 7.2.1.10.1 Existing Revolving Door Assembly Maximum Speed

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

(2745 mm) diameter, a revolving door assembly shall be permitted egress capacity based on the clear opening width provided when collapsed into a book-fold position.

(3) Revolving door wings shall be capable of being collapsed into a book-fold position when a force not exceeding 130 lbf (580 N) is applied to the wings within 3 in. (75 mm) of the outer edge.

7.2.1.10.3 Revolving door assemblies not used as a component of a means of egress shall have a collapsing force not exceeding 180 lbf (800 N) applied at a point 3 in. (75 mm) from the outer edge of the outer wing stile and 40 in. (1015 mm) above the floor.

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

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

7.2.1.11 Turnstiles and Similar Devices.

7.2.1.11.1 Turnstiles or similar devices that restrict travel to one direction or are used to collect fares or admission charges shall not be placed so as to obstruct any required means of egress, unless otherwise specified in 7.2.1.11.1.1, 7.2.1.11.1.2, and 7.2.1.11.1.3.

7.2.1.11.1.1 Approved turnstiles not exceeding 39 in. (990 mm) in height that turn freely in the direction of egress travel shall be permitted where revolving door assemblies are permitted in Chapters 11 through 43.

7.2.1.11.1.2 Where turnstiles are approved by the authority having jurisdiction and permitted in Chapters 11 through 43, each turnstile shall be credited for a capacity of 50 persons, provided that such turnstiles meet all of the following criteria:

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

7.2.1.11.1.3* Security access turnstiles that impede travel in the direction of egress utilizing a physical barrier shall be permitted to be considered as a component of the means of egress, where permitted in Chapters 11 through 43, provided that all the following criteria are met:

(1) The building is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.
(2) Each security access turnstile lane configuration has a minimum clear passage width of 22 in. (560 mm).
(3) Any security access turnstile lane configuration providing a clear passage width of less than 32 in. (810 mm) shall be given an egress capacity of 50 persons.
(4) Any security access turnstile lane configuration providing a clear passage width of 32 in. (810 mm) or more shall be given an egress capacity as calculated in accordance with Section 7.3.
(5) Each secured physical barrier shall automatically retract or swing to an unobstructed open position in the direction of egress, under each of the following conditions:
   (a) Upon loss of power to the turnstile or any part of the access control system that secures the physical barrier
   (b) Upon actuation of a readily accessible and clearly identified manual release device that results in direct interruption of power to each secured physical barrier, remains in the open position for not less than 30 seconds, and is positioned at one of the following locations:
      i. The manual release device is located on the egress side of each security access turnstile lane.
      ii. The manual release device is located at an approved location where it can be actuated by an employee assigned to the area.
   (c) Upon actuation of the building fire-protective signaling system, if provided, and for which the following apply:
      i. The physical barrier remains in the open position until the fire-protective signaling system is manually reset.
      ii. The actuation of manual fire alarm boxes that actuate the building fire-protective signaling system is not required to meet the requirements specified in 7.2.1.11.1.3(5)(c)i.
   (d) Upon actuation of the building automatic sprinkler or fire detection system, and for which the physical barrier remains in the open position until the fire-protective signaling system is manually reset

7.2.1.11.2 Turnstiles exceeding 39 in. (990 mm) in height shall meet the requirements for revolving door assemblies in 7.2.1.10 or the requirements of 7.2.1.11.1.3 for security access turnstiles.

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

7.2.1.12 Door Openings in Folding Partitions. Where permanently mounted folding or movable partitions divide a room into smaller spaces, a swinging door leaf or open doorway shall be provided as an exit access from each such space, unless otherwise specified in 7.2.1.12.1 or 7.2.1.12.2.

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

(1) The subdivided space is used by not more than 20 persons at any time.
(2) The use of the space is under adult supervision.

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

Δ **7.2.1.12.2** The door leaf or opening in the folding partition shall not be required where each space on both sides of the folding partition is provided with compliant means of egress without requiring travel through the folding partition.

7.2.1.13 Special-Purpose Horizontally Sliding Accordion or Folding Door Assemblies. Special-purpose horizontally sliding accordion or folding door assemblies shall be permitted in means of egress, provided that all of the following criteria are met:

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

7.2.1.14 Inspection of Door Openings.

7.2.1.14.1* Where required by Chapters 11 through 43, the following door assemblies shall be inspected and tested not less than annually in accordance with 7.2.1.14.2 through 7.2.1.14.7:

(1) Door leaves equipped with panic hardware or fire exit hardware in accordance with 7.2.1.7
(2) Door assemblies in exit enclosures
(3) Door hardware release of electrically locked egress door assemblies
(4) Door assemblies with special locking arrangements subject to 7.2.1.6

7.2.1.14.2* The inspection and testing interval for fire-rated and nonrated door assemblies shall be permitted to exceed 12 months under a written performance-based program.

7.2.1.14.2.1 Goals established under a performance-based program shall provide assurance that the door assembly will perform its intended function.

7.2.1.14.2.2 Technical justification for inspection, testing, and maintenance intervals shall be documented.

7.2.1.14.2.3 The performance-based option shall include historical data.

7.2.1.14.3 A written record of the inspections and testing shall be signed and kept for inspection by the authority having jurisdiction.

7.2.1.14.4 Functional testing of door assemblies shall be performed by individuals who can demonstrate knowledge and understanding of the operating components of the type of door being subjected to testing.

7.2.1.14.5 Door assemblies shall be visually inspected from both sides of the opening to assess the overall condition of the assembly.

7.2.1.14.6 As a minimum, the following items shall be verified:

(1) Floor space on both sides of the openings is clear of obstructions, and door leaves open fully and close freely.
(2) Forces required to set door leaves in motion and move to the fully open position do not exceed the requirements in 7.2.1.4.5.
(3) Latching and locking devices comply with 7.2.1.5.
(4) Releasing hardware devices are installed in accordance with 7.2.1.5.3.1.
(5) Door leaves of paired openings are installed in accordance with 7.2.1.5.9.
(6) Door closers are adjusted properly to control the closing speed of door leaves in accordance with accessibility requirements.
(7) Projection of door leaves into the path of egress does not exceed the encroachment permitted by 7.2.1.4.3.
(8) Powered door openings operate in accordance with 7.2.1.9.
(9) Signage required by 7.2.1.4.1(3), 7.2.1.5.6, 7.2.1.6, and 7.2.1.9 is intact and legible.
(10) Door openings with special locking arrangements function in accordance with 7.2.1.6.
(11) Security devices that impede egress are not installed on openings, as required by 7.2.1.5.10.
(12) Where required by 7.2.2.5.5.7, door hardware marking is present and intact.
(13) Emergency lighting on sensor-release of electrical locking systems and doors equipped with delayed-egress electrical locking systems is present in accordance with Section 7.9.

7.2.1.14.7* Door openings not in proper operating condition shall be repaired or replaced without delay.

7.2.1.15* Inspection of Grille Assemblies.

7.2.1.15.1 Where required by Chapters 11 through 43, grille assemblies shall be inspected and tested not less than annually in accordance with 7.2.1.15.2 through 7.2.1.15.6.

7.2.1.15.2 A record of all inspections and testing shall be signed by the inspector and kept for inspection by the authority having jurisdiction. Records of acceptance tests shall be retained for the life of the assembly.

7.2.1.15.3 Functional testing of grille assemblies shall be performed by individuals who can demonstrate knowledge and understanding of the operating components of the type of grille being subjected to testing.

7.2.1.15.4 Grille assemblies shall be visually inspected from both sides of the opening to assess the overall condition of the assembly.

Δ **7.2.1.15.5** As a minimum, the following items shall be verified:

(1) Floor space on both sides of the openings is clear of obstructions, and the grille assembly opens fully and closes freely.
(2) Forces required to set the grille assembly in motion and move to the fully open position do not exceed the requirements of 7.2.1.4.5.
(3) Latching and locking devices comply with 7.2.1.5.
(4) Releasing hardware devices are installed in accordance with 7.2.1.5.3.1.
(5) Grille assemblies are adjusted properly to control the closing speed of grilles in accordance with accessibility requirements.
(6) Powered grille assemblies operate in accordance with 7.2.1.9.
(7) Signage required by 7.2.1.4.1(3), 7.2.1.5.5, 7.2.1.6, and 7.2.1.9 is intact and legible.
(8) Grille assemblies with special locking arrangements function in accordance with 7.2.1.6.
(9) Security devices that impede egress are not installed on openings as required by 7.2.1.5.10.
(10) Where required by 7.2.2.5.5.7, grille hardware marking is present and intact.
(11) Emergency lighting on grille assemblies equipped with delayed-egress locking systems is present and functioning in accordance with Section 7.9.

7.2.1.15.6 Grille assemblies not in proper operating condition shall be repaired or replaced without delay.

7.2.2 Stairs.

7.2.2.1 General.

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

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

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

7.2.2.2 Dimensional Criteria.

7.2.2.2.1 Standard Stairs.

7.2.2.2.1.1 Stairs shall meet the following criteria:

(1) New stairs shall be in accordance with Table 7.2.2.2.1.1(a) and 7.2.2.2.1.2.
(2)* Existing stairs shall be permitted to remain in use, provided that they meet the requirements for existing stairs shown in Table 7.2.2.2.1.1(b).
(3) Approved existing stairs shall be permitted to be rebuilt in accordance with the following:
   (a) Dimensional criteria of Table 7.2.2.2.1.1(b)
   (b) Other stair requirements of 7.2.2
(4) The requirements for new and existing stairs shall not apply to stairs located in industrial equipment access areas where otherwise provided in 40.2.5.3.

Table 7.2.2.2.1.1(a) New Stairs

Feature	Dimensional Criteria ft/in.	Dimensional Criteria mm
Minimum width	See 7.2.2.2.1.2.	
Maximum height of risers	7 in.	180
Minimum height of risers	4 in.	100
Minimum tread depth	11 in.	280
Minimum headroom	6 ft 8 in.	2030
Maximum height between landings	12 ft	3660
Landing	See 7.2.1.3, 7.2.1.4.3.1, and 7.2.2.3.2.	

Table 7.2.2.2.1.1(b) Existing Stairs

Feature	Dimensional Criteria ft/in.	Dimensional Criteria mm
Minimum width clear of all obstructions, except projections not more than 4½ in. (114 mm) at or below handrail height on each side	36 in.	915
Maximum height of risers	8 in.	205
Minimum tread depth	9 in.	230
Minimum headroom	6 ft 8 in.	2030
Maximum height between landings	12 ft	3660
Landing	See 7.2.1.3 and 7.2.1.4.3.1.	

7.2.2.2.1.2* Minimum New Stair Width. *(See also 7.3.3.)*

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

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

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

Table 7.2.2.2.1.2(B) New Stair Width

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

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

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

(F) The clear width of door openings discharging from stairways required to be a minimum of 56 in. (1420 mm) wide in accordance with 7.2.2.2.1.2(B) shall be in accordance with 7.2.1.2.3.2(9).

7.2.2.2.2 Curved Stairs.

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

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

7.2.2.2.3 Spiral Stairs.

7.2.2.2.3.1 Where specifically permitted for individual occupancies by Chapters 11 through 43, spiral stairs shall be permitted as a component in a means of egress in accordance with 7.2.2.2.3.2 through 7.2.2.2.3.4.

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

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

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

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

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

7.2.2.2.4* Winders.

7.2.2.2.4.1 Where specified in Chapters 11 through 43, winders shall be permitted in stairs, provided that they meet the requirements of 7.2.2.2.4.2 and 7.2.2.2.4.3.

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

7.2.2.2.4.3 Existing winders shall be permitted to be continued in use, provided that they have a tread depth of not less than 6 in. (150 mm) and a tread depth of not less than 9 in. (230 mm) at a point 12 in. (305 mm) from the narrowest edge.

7.2.2.3 Stair Details.

7.2.2.3.1 Construction.

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

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

7.2.2.3.2 Landings.

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

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

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

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

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

7.2.2.3.3 Tread and Landing Surfaces.

7.2.2.3.3.1 Stair treads and landings shall be solid, without perforations, unless otherwise permitted in 7.2.2.3.3.5.

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

7.2.2.3.3.3* Stair treads and landings within the same stairway shall have consistent surface traction.

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

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

(1) Assembly occupancies as otherwise provided in Chapters 12 and 13

(2) Detention and correctional occupancies as otherwise provided in Chapters 22 and 23
(3) Industrial occupancies as otherwise provided in Chapter 40
(4) Storage occupancies as otherwise provided in Chapter 42

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

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

7.2.2.3.6* Dimensional Uniformity.

7.2.2.3.6.1 Variation in excess of 3/16 in. (4.8 mm) in the sizes of adjacent tread depths or in the height of adjacent risers shall be prohibited, unless otherwise permitted in 7.2.2.3.6.3.

7.2.2.3.6.2 The variation between the sizes of the largest and smallest riser or between the largest and smallest tread depths shall not exceed ⅜ in. (9.5 mm) in any flight.

7.2.2.3.6.3 Where the bottom or top riser adjoins a sloping public way, walk, or driveway having an established finished ground level and serves as a landing, the bottom or top riser shall be permitted to have a variation in height of not more than 1 in. in every 12 in. (25 mm in every 305 mm) of stairway width.

7.2.2.3.6.4 The size of the variations addressed by 7.2.2.3.6.1, 7.2.2.3.6.2, and 7.2.2.3.6.3 shall be based on the nosing-to-nosing dimensions of the tread depths and riser heights, consistent with the measurement details set out in 7.2.2.3.5.

7.2.2.3.6.5* All tread nosings of stairs utilizing the provision of 7.2.2.3.6.3 shall be marked in accordance with 7.2.2.5.4.3. Those portions of the marking stripe at locations where the riser height below the nosing is inconsistent by more than 3/16 in. (4.8 mm), relative to other risers in the stair flight, shall be distinctively colored or patterned, incorporating safety yellow, to warn descending users of the inconsistent geometry relative to other steps in the flight.

7.2.2.3.6.6 The variation in the horizontal projection of all nosings, including the projection of the landing nosing, shall not exceed ⅜ in. (9.5 mm) within each stair flight and, for other than existing nosings, shall not exceed 3/16 in. (4.8 mm) between adjacent nosings.

7.2.2.4 Guards and Handrails.

7.2.2.4.1 Handrails.

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

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

(1) For new stairs, handrails shall be provided within 30 in. (760 mm) of all portions of the required egress width.
(2) For existing stairs, handrails shall meet the following criteria:
   (a) They shall be provided within 44 in. (1120 mm) of all portions of the required egress width.
   (b) Such stairs shall not have their egress capacity adjusted to a higher occupant load than permitted by the capacity factor in Table 7.3.3.1 if the stair's clear width between handrails exceeds 60 in. (1525 mm).

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

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

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

7.2.2.4.1.6 Handrails shall be required at one side only for the following components:

(1) Existing stairs
(2) Existing ramps
(3) New and existing stairs within dwelling units and within guest rooms
(4) New and existing ramps within dwelling units and within guest rooms

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

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

7.2.2.4.4 Direction. For standard stairs, at least one handrail shall be installed at a right angle to the leading edge of the stair treads.

7.2.2.4.5* Handrail Details.

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

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

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

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

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

7.2.2.4.5.6 Handrails shall include one of the following features:

(1) Circular cross section with an outside diameter of not less than $1\frac{1}{4}$ in. (32 mm) and not more than 2 in. (51 mm)
(2)* Shape that is other than circular with a perimeter dimension of not less than 4 in. (100 mm), but not more than $6\frac{1}{4}$ in. (160 mm), and with the largest cross-sectional dimension not more than $2\frac{1}{4}$ in. (57 mm), provided that graspable edges are rounded so as to provide a radius of not less than $\frac{1}{8}$ in. (3.2 mm)

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

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

(1) They do not project horizontally beyond the sides of the handrail within $1\frac{1}{2}$ in. (38 mm) of the bottom of the handrail and provided that, for each additional $\frac{1}{2}$ in. (13 mm) of handrail perimeter dimension greater than 4 in. (100 mm), the vertical clearance dimension of $1\frac{1}{2}$ in. (38 mm) is reduced by $\frac{1}{8}$ in. (3.2 mm).
(2) They have edges with a radius of not less than 0.01 in. (0.25 mm).

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

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

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

7.2.2.4.6 Guard Details. See 7.1.8 for guard requirements.

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

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

(1) Existing guards within dwelling units shall be permitted to be not less than 36 in. (915 mm) high.
(2) The requirement of 7.2.2.4.6.2 shall not apply in assembly occupancies where otherwise provided in Chapters 12 and 13.
(3)* Existing guards on existing stairs shall be permitted to be not less than 30 in. (760 mm) high.

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

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

7.2.2.5 Enclosure and Protection of Stairs.

7.2.2.5.1 Enclosures.

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

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

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

7.2.2.5.2* Exposures.

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

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

7.2.2.5.2.3 The fire resistance rating of the separation extending 10 ft (3050 mm) from the stairs shall not be required to exceed 1 hour where openings have a minimum $\frac{3}{4}$-hour fire protection rating.

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

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

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

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

7.2.2.5.4* Stairway Identification.

7.2.2.5.4.1 New enclosed stairs serving three or more stories and existing enclosed stairs, other than those addressed in 7.2.2.5.4.1(P), serving five or more stories shall comply with 7.2.2.5.4.1(A) through 7.2.2.5.4.1(O).

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

(B) The signage shall indicate the floor level.

(C) The signage shall indicate the terminus of the top and bottom of the stair enclosure.

(D) The signage shall indicate the identification of the stair enclosure.

(E) The signage shall indicate the floor level of, and the direction to, exit discharge.

(F) The signage shall be located inside the stair enclosure.

(G) The bottom of the signage shall be located a minimum of 48 in. (1220 mm) above the floor landing, and the top of the signage shall be located a maximum of 84 in. (2135 mm) above the floor landing.

(H) The signage shall be in a position that is visible from within the stair enclosure when the door is in the open or closed position.

(I) The signage shall comply with 7.10.8.1 and 7.10.8.2 of this *Code*.

(J) The floor level designation shall also be tactile in accordance with ICC A117.1, *Accessible and Usable Buildings and Facilities*.

(K) The signage shall be painted or stenciled on the wall or on a separate sign securely attached to the wall.

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

(M)* Signage that reads NO ROOF ACCESS shall designate stairways that do not provide roof access. Lettering shall be a minimum of 1 in. (25 mm) high and shall be in accordance with 7.10.8.2.

(N) The floor level number shall be located below the stairway identifier in minimum 5 in. (125 mm) high numbers and shall be in accordance with 7.10.8.2. Mezzanine levels shall have the letter "M" or other appropriate identification letter preceding the floor number, while basement levels shall have the letter "B" or other appropriate identification letter preceding the floor level number.

(O) Identification of the lower and upper terminus of the stairway shall be on the sign in minimum 1 in. (25 mm) high letters or numbers and shall be in accordance with 7.10.8.2.

(P) Previously approved existing signage shall not be required to comply with 7.2.2.5.4.1(J) or 7.2.2.5.4.1(L) through 7.2.2.5.4.1(O).

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

(1) Such signage shall comply with 7.10.8.1 and 7.10.8.2.
(2) Such signage shall be visible when the door leaf is in the open or closed position.

(A) The requirement of 7.2.2.5.4.2 shall not apply where signs required by 7.2.2.5.4.1 are provided.

(B) The requirement of 7.2.2.5.4.2 shall not apply to stairs extending not more than one story below the level of exit discharge where the exit discharge is clearly obvious.

7.2.2.5.4.3* Stairway Tread Marking. Where new contrasting marking is applied to stairs, such marking shall comply with all of the following:

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

7.2.2.5.4.4* Where new contrast marking is provided for stairway handrails, it shall be applied to, or be part of, at least the upper surface of the handrail; have a minimum width of ½ in. (13 mm); and extend the full length of each handrail. After marking, the handrail shall comply with 7.2.2.4.5. Where handrails or handrail extensions bend or turn corners, the stripe shall be permitted to have a gap of not more than 4 in. (100 mm).

7.2.2.5.5 Exit Stair Path Markings. Where exit stair path markings are required in Chapters 11 through 43, such markings shall be installed in accordance with 7.2.2.5.5.1 through 7.2.2.5.5.11.

7.2.2.5.5.1* Exit Stair Treads. Exit stair treads shall incorporate a marking stripe that is applied as a paint/coating or be a material that is integral with the nosing of each step.

(A) The marking stripe shall be installed along the horizontal leading edge of the step and shall extend the full width of the step.

(B) The marking stripe shall also meet all of the following requirements:

(1) The marking stripe shall be not more than ½ in. (13 mm) from the leading edge of each step and shall not overlap the leading edge of the step by more than ½ in. (13 mm) down the vertical face of the step.
(2) The marking stripe shall have a minimum horizontal width of 1 in. (25 mm) and a maximum width of 2 in. (51 mm).
(3) The dimensions and placement of the marking stripe shall be uniform and consistent on each step throughout the exit enclosure.
(4) Surface-applied marking stripes using adhesive-backed tapes shall not be used.

7.2.2.5.5.2 Exit Stair Landings. The leading edge of exit stair landings shall be marked with a solid and continuous marking stripe consistent with the dimensional requirements for stair treads and shall be the same length as, and consistent with, the stripes on the steps.

7.2.2.5.5.3 Exit Stair Handrails. All handrails and handrail extensions shall be marked with a solid and continuous marking stripe and meet all of the following requirements:

(1) The marking stripe shall be applied to the upper surface of the handrail or be a material integral with the upper surface of the handrail for the entire length of the handrail, including extensions.

(2) Where handrails or handrail extensions bend or turn corners, the marking stripe shall be permitted to have a gap of not more than 4 in. (100 mm).
(3) The marking stripe shall have a minimum horizontal width of 1 in. (25 mm), which shall not apply to outlining stripes listed in accordance with UL 1994, *Luminous Egress Path Marking Systems*.
(4) The dimensions and placement of the marking stripe shall be uniform and consistent on each handrail throughout the exit enclosure.

7.2.2.5.5.4 Perimeter Demarcation Marking. Stair landings, exit passageways, and other parts of the floor areas within the exit enclosure shall be provided with a solid and continuous perimeter demarcation marking stripe on the floor or on the walls or a combination of both. The marking stripe shall also meet all of the following requirements:

(1) The marking stripe shall have a minimum horizontal width of 1 in. (25 mm) and a maximum width of 2 in. (51 mm), with interruptions not exceeding 4 in. (100 mm).
(2) The minimum marking stripe width of 1 in. (25 mm) shall not apply to outlining stripes listed in accordance with UL 1994, *Luminous Egress Path Marking Systems*.
(3) The dimensions and placement of the perimeter demarcation marking stripe shall be uniform and consistent throughout the exit enclosure.
(4) Surface-applied marking stripes using adhesive-backed tapes shall not be used.

(A) Perimeter floor demarcation lines shall comply with all of the following:

(1) They shall be placed within 4 in. (100 mm) of the wall and extend to within 2 in. (51 mm) of the markings on the leading edge of landings.
(2) They shall continue across the floor in front of all doors.
(3) They shall not extend in front of exit doors leading out of an exit enclosure and through which occupants must travel to complete the egress path.

(B) Perimeter wall demarcation lines shall comply with all of the following:

(1) They shall be placed on the wall with the bottom edge of the stripe not more than 4 in. (100 mm) above the finished floor.
(2) At the top or bottom of the stairs, they shall drop vertically to the floor within 2 in. (51 mm) of the step or landing edge.
(3) They 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.
(4) Where the wall line is broken by a door, they shall continue across the face of the door or transition to the floor and extend across the floor in front of such door.
(5) They shall not extend in front of doors leading out of an exit enclosure and through which occupants must travel to complete the egress path.
(6) 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 complementary extension of the floor-mounted demarcation line, thus forming a continuous marking.

7.2.2.5.5.5* Obstacles. Obstacles that are in the exit enclosure at or below 6 ft 6 in. (1980 mm) in height, and that project more than 4 in. (100 mm) into the egress path, shall be identified with markings not less than 1 in. (25 mm) in horizontal width composed of a pattern of alternating equal bands of luminescent material and black; and with the alternating bands not more than 2 in. (51 mm) in horizontal width and angled at 45 degrees.

7.2.2.5.5.6 Doors Serving Exit Enclosure. All doors serving the exit enclosure that swing out from the enclosure in the direction of egress travel shall be provided with a marking stripe on the top and sides of the door(s) frame(s). The marking stripe shall also meet all of the following requirements:

(1) The marking stripe shall have a minimum horizontal width of 1 in. (25 mm) and a maximum width of 2 in. (51 mm).
(2) Gaps shall be permitted in the continuity of door frame markings where a line is fitted into a corner or bend, but shall be as small as practicable, and in no case shall gaps be greater than 1 in. (25 mm).
(3) Where the door molding does not provide enough flat surface on which to locate the marking stripe, the marking stripe shall be located on the wall surrounding the frame.
(4) The dimensions and placement of the marking stripe shall be uniform and consistent on all doors in the exit enclosure.

7.2.2.5.5.7 Door Hardware Marking.

(A) The door hardware for the doors serving the exit enclosure that swing out from the enclosure in the direction of egress travel shall be provided with a marking stripe.

(B) The marking stripe shall also meet the following requirements:

(1)* The door hardware necessary to release the latch shall be outlined with an approved marking stripe having a minimum width of 1 in. (25 mm).
(2) Where panic hardware is installed, both of the following criteria shall be met:
   (a) The marking stripe shall have a minimum width of 1 in. (25 mm) and be applied to the entire length of the actuating bar or touch pad.
   (b) The placement of the marking stripe shall not interfere with viewing of any instructions on the actuating bar or touch pad.

7.2.2.5.5.8 Emergency Exit Symbol. An emergency exit symbol with a luminescent background shall be applied on all doors serving the exit enclosure that swing out from the enclosure in the direction of egress travel. The emergency exit symbol shall also meet both of the following requirements:

(1) The emergency exit symbol shall meet the requirements of NFPA 170.
(2) The emergency exit symbol applied on the door shall be a minimum of 4 in. (100 mm) in height and shall be applied on the door, centered horizontally, with the top of the symbol not higher than 18 in. (455 mm) above the finished floor.

7.2.2.5.5.9 Uniformity. Placement and dimensions of the marking stripes shall be consistent and uniform throughout the same exit enclosure.

7.2.2.5.5.10 Materials.

(A) Exit stair path markings shall be made of any material, including paint, provided that an electrical charge is not required to maintain the required luminescence.

(B) Such materials shall include, but shall not be limited to, self-luminous materials and photoluminescent materials.

(C) Materials shall comply with either of the following:

(1) ASTM E2072, *Standard Specification for Photoluminescent (Phosphorescent) Safety Markings*, and ASTM E2073, *Standard Test Method for Photopic Luminance of Photoluminescent (Phosphorescent) Markings*
(2) UL 1994, *Luminous Egress Path Marking Systems*

7.2.2.5.5.11 Exit Stair Illumination. Exit enclosures where photoluminescent materials are installed shall comply with all of the following:

(1) The exit enclosure shall be continuously illuminated for at least 60 minutes prior to periods when the building is occupied.
(2) The illumination shall remain on when the building is occupied.
(3) Lighting control devices provided for illumination within the exit enclosure shall meet all of the following requirements:
    (a) Lighting control devices that automatically turn exit enclosure lighting on and off, based on occupancy, shall be permitted, provided that they turn on illumination for charging photoluminescent materials for at least 60 minutes prior to periods when the building is occupied.
    (b) Lighting used to charge photoluminescent materials shall not be controlled by motion sensors.
    (c) Lighting control devices that dim the lighting levels within the exit enclosure shall not be installed unless they provide a minimum of 1 ft-candle (10.8 lux) of illumination within the exit enclosure measured at the walking surface.

7.2.2.6 Special Provisions for Outside Stairs.

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

7.2.2.6.2* Visual Protection. Outside stairs shall be arranged to avoid any impediments to their use by persons having a fear of high places. Outside stairs more than 36 ft (11 m) above the finished ground level, other than previously approved existing stairs, shall be provided with an opaque visual obstruction not less than 48. in. (1220 mm) in height.

7.2.2.6.3 Separation and Protection of Outside Stairs.

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

(1) Outside stairs serving an exterior exit access balcony that has two remote outside stairways or ramps shall be permitted to be unprotected.
(2) Outside stairs serving two or fewer adjacent stories, including the story where the exit discharges, shall be permitted to be unprotected where there is a remotely located second exit.
(3) In existing buildings, existing outside stairs serving three or fewer adjacent stories, including the story where the exit discharges, shall be permitted to be unprotected where there is a remotely located second exit.
(4) The fire resistance rating of a separation extending 10 ft (3050 mm) from the stairs shall not be required to exceed 1 hour where openings have a minimum ¾-hour fire protection rating.
(5) Outside stairs in existing buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7 shall be permitted to be unprotected.

7.2.2.6.3.2 Wall construction required by 7.2.2.6.3.1 shall extend as follows:

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

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

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

7.2.2.6.4 Protection of Openings. All openings below an outside stair shall be protected with an assembly having a minimum ¾-hour fire protection rating as follows:

(1) Where located in an enclosed court *(see 3.3.52.1)*, the smallest dimension of which does not exceed one-third its height
(2) Where located in an alcove having a width that does not exceed one-third its height and a depth that does not exceed one-fourth its height

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

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

7.2.3 Smokeproof Enclosures.

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

7.2.3.2 Performance Design. An appropriate design method shall be used to provide a system that meets the definition of *smokeproof enclosure (see 3.3.277)*. The smokeproof enclosure shall be permitted to be created by using natural ventilation, by using mechanical ventilation incorporating a vestibule, or by pressurizing the stair enclosure.

7.2.3.3 Enclosure.

7.2.3.3.1 A smokeproof enclosure shall be continuously enclosed by barriers having a 2-hour fire resistance rating from the highest point to the level of exit discharge, except as otherwise permitted in 7.2.3.3.3.

7.2.3.3.2 Where a vestibule is used in accordance with 7.2.3.2, it shall be within the 2-hour-rated enclosure and shall be considered part of the smokeproof enclosure.

7.2.3.3.3 A smokeproof enclosure comprised of an enclosed stair and serving floors below the level of exit discharge shall not be required to comply with 7.2.3.3.1 where the portion of the stairway below is separated from the stairway enclosure at the level of exit discharge by barriers with a 1-hour fire resistance rating.

7.2.3.4 Vestibule. Where a vestibule is provided, the door opening into the vestibule shall be protected with an approved fire door assembly having a minimum 1½-hour fire protection rating, and the fire door assembly from the vestibule to the smokeproof enclosure shall have a minimum 20-minute fire protection rating. Door leaves shall be designed to minimize air leakage and shall be self-closing or shall be automatic-closing by actuation of a smoke detector within 10 ft (3050 mm) of the vestibule door opening. New door assemblies shall be installed in accordance with NFPA 105.

7.2.3.5 Discharge.

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

7.2.3.5.2 The smokeproof enclosure shall be permitted to discharge through interior building areas, provided that all of the following criteria are met:

(1) The building shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.
(2) The discharge from the smokeproof enclosure shall lead to a free and unobstructed way to an exterior exit, and such way shall be readily visible and identifiable from the point of discharge from the smokeproof enclosure.
(3) Not more than 50 percent of the required number and capacity of exits comprised of smokeproof enclosures shall discharge through interior building areas in accordance with 7.7.2.

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

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

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

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

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

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

7.2.3.8.3 To serve as a smoke and heat trap and to provide an upward-moving air column, the vestibule ceiling shall be not less than 20 in. (510 mm) higher than the door opening into the vestibule. The height shall be permitted to be decreased where justified by engineering design and field testing.

7.2.3.8.4 The stair shall be provided with a dampered relief opening at the top and supplied mechanically with sufficient air to discharge at least 2500 ft^3/min (70.8 m^3/min) through the relief opening while maintaining a positive pressure of not less than 0.10 in. water column (25 N/m^2) in the stair, relative to the vestibule with all door leaves closed.

7.2.3.9 Enclosure Pressurization.

7.2.3.9.1* Smokeproof enclosures using pressurization shall use an approved engineered system with a design pressure difference across the barrier of not less than 0.05 in. water column (12.5 N/m^2) in sprinklered buildings, or 0.10 in. water column (25 N/m^2) in nonsprinklered buildings, and shall be capable of maintaining these pressure differences under likely conditions of stack effect or wind. The pressure difference across door openings shall not exceed that which allows the door leaves to begin to be opened by a force of 30 lbf (133 N) in accordance with 7.2.1.4.5.

7.2.3.9.1.1 Smokeproof enclosures using pressurization shall be in accordance with NFPA 92.

7.2.3.9.2* Equipment, control wiring, power wiring, and ductwork for pressurization shall be located in accordance with one of the following specifications:

(1) Exterior to the building and directly connected to the enclosure by ductwork enclosed in noncombustible construction
(2) Within the enclosure with intake and exhaust air vented directly to the outside or through ductwork enclosed by a 2-hour fire-resistive rating
(3) Within the building under the following conditions:
    (a) Where the equipment, control wiring, power wiring, and ductwork are separated from the remainder of

the building, including other mechanical equipment, by a 2-hour fire-resistive rating

(b) Where the building, including the enclosure, is protected throughout by an approved, supervised automatic sprinkler system installed in accordance with Section 9.7, and the equipment, control wiring, power wiring, and ductwork are separated from the remainder of the building, including other mechanical equipment, by not less than a 1-hour fire-resistive rating

Δ **7.2.3.9.3** In all cases specified by 7.2.3.9.2(1) through 7.2.3.9.2(3), openings into the required fire-resistance-rated construction shall be limited to those needed for maintenance and operation and shall be protected by self-closing fire-protection-rated devices in accordance with 8.3.3.4.1.

7.2.3.9.4 The requirement of 7.2.3.9.2 shall not apply to any of the following:

(1) Control wiring and power wiring utilizing a 2-hour-rated cable or cable system
(2) Control wiring and power wiring encased with not less than 2 in. (51 mm) of concrete
(3) Control wiring and power wiring protected by a listed electrical circuit protective system with not less than a 2-hour fire-resistive rating

7.2.3.10 Activation of Mechanical Ventilation and Pressurized Enclosure Systems.

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

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

(1) Waterflow signal from a complete automatic sprinkler system
(2) General evacuation alarm signal *(see 9.6.3.7)*

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

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

(1) A Type 60, Class 2, Level 2 EPSS for new mechanical ventilation equipment and enclosure pressurization systems shall be provided in accordance with NFPA 110.
(2) A previously approved existing standby power generator installation with a fuel supply adequate to operate the equipment for 2 hours shall be permitted in lieu of 7.2.3.12.
(3) The generator shall be located in a room separated from the remainder of the building by fire barriers having a minimum 1-hour fire resistance rating.

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

7.2.4 Horizontal Exits.

7.2.4.1 General.

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

7.2.4.1.2* Horizontal exits shall be permitted to be substituted for other exits provided that both of the following are met, unless otherwise permitted by 7.2.4.1.3:

(1) A minimum of half of the number of exits from any compartment created by horizontal exits is provided by other than horizontal exits
(2) A minimum of half of the egress capacity required for any compartment created by horizontal exits is provided by other than horizontal exits

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

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

7.2.4.2 Fire Compartments.

7.2.4.2.1 Every fire compartment for which credit is permitted in connection with a horizontal exit(s) also shall have at least one additional exit, but not less than 50 percent of the required number and capacity of exits, that is not a horizontal exit, unless otherwise provided in 7.2.4.2.1.2.

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

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

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

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

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

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

7.2.4.2.4 The floor area on either side of a horizontal exit shall be sufficient to hold the occupants of both floor areas and shall provide at least 3 ft^2 (0.28 m^2) clear floor area per person, unless otherwise permitted for the following:

(1) Health care occupancies as provided in Chapters 18 and 19

(2) Detention and correctional occupancies as provided in Chapters 22 and 23

7.2.4.3 Fire Barriers.

7.2.4.3.1* Fire barriers separating buildings or areas between which there are horizontal exits shall meet both of the following requirements:

(1) The barrier shall have a minimum 2-hour fire resistance rating, unless otherwise provided in 7.2.4.4.1.
(2) The barrier shall provide a separation that is continuous to the finished ground level, unless otherwise provided in 7.2.4.3.2. *(See also Section 8.3.)*

7.2.4.3.2* The separation required by 7.2.4.3.1(2) shall not be required to extend below the lowest level providing discharge to the exterior where both of the following are met:

(1) Stories below the lowest level providing discharge to the exterior do not have a horizontal exit.
(2) Stories below the lowest level providing discharge to the exterior are separated from the level above by a minimum of 2-hour fire-resistance-rated construction.

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

(1) The stories on which the fire barrier is omitted are separated from the story with the horizontal exit by construction having a fire resistance rating at least equal to that of the horizontal exit fire barrier.
(2) Vertical openings between the story with the horizontal exit and the open fire area story are enclosed with construction having a fire resistance rating at least equal to that of the horizontal exit fire barrier.
(3) All required exits, other than horizontal exits, discharge directly to the outside unless the building is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

7.2.4.3.4 Where fire barriers serving horizontal exits, other than existing horizontal exits, terminate at outside walls, and the outside walls are at an angle of less than 180 degrees for a distance of 10 ft (3050 mm) on each side of the horizontal exit, the outside walls shall be protected by one of the following methods:

(1) The outside walls shall have a minimum 1-hour fire resistance rating, with opening protectives having a minimum ¾-hour fire protection rating, for a distance of 10 ft (3050 mm) on each side of the horizontal exit.
(2) One of the outside walls shall have a 2-hour fire resistance rating with opening protectives having a minimum 1½-hour fire protection rating, for a distance of 10 ft (3050 mm) from intersection with the horizontal exit.

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

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

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

7.2.4.3.7 Door assemblies in horizontal exits shall comply with 7.2.1.4, unless they are sliding door assemblies in industrial or storage occupancies as otherwise provided in Chapters 40 and 42.

7.2.4.3.8 Unless otherwise specified in 7.2.4.3.8.1 and 7.2.4.3.8.2, swinging fire door assemblies shall be permitted in horizontal exits, provided that the criteria of both 7.2.4.3.8(1) and 7.2.4.3.8(2), or the criteria of both 7.2.4.3.8(1) and 7.2.4.3.8(3), are met as follows:

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

7.2.4.3.8.1 The requirements of 7.2.4.3.8 shall not apply to horizontal exit door leaf swing as provided in Chapters 19 and 23.

7.2.4.3.8.2 The requirements of 7.2.4.3.8 shall not apply to horizontal exit door assemblies in corridors not more than 6 ft (1830 mm) wide in existing buildings.

7.2.4.3.9 Door leaves in horizontal exits shall be designed and installed to minimize air leakage. New door assemblies in horizontal exits shall be installed in accordance with NFPA 105.

7.2.4.3.10* All fire door assemblies in horizontal exits shall be self-closing or automatic-closing in accordance with 7.2.1.8.

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

7.2.4.4 Bridges Serving Horizontal Exits Between Buildings. The provisions of 7.2.4.4 shall apply to bridges serving horizontal exits between buildings and to the associated horizontal exit fire barrier.

7.2.4.4.1 The minimum 2-hour fire-resistance-rated barrier required by 7.2.4.3.1 shall extend as follows:

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

7.2.4.4.2 Any opening in the fire barrier addressed in 7.2.4.4.1 shall be protected with fire door assemblies or fixed fire window assemblies having a ¾-hour fire protection rating, unless otherwise provided in 7.2.4.4.3.

7.2.4.4.3 The requirement of 7.2.4.4.2 shall not apply to approved existing bridges.

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

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

7.2.4.4.5 Where the bridge serves as a horizontal exit in both directions, door leaves shall be provided in pairs that swing in opposite directions, with only the door leaf swinging in the direction of egress travel included when determining egress capacity, unless otherwise provided in 7.2.4.4.5.1 through 7.2.4.4.5.3.

7.2.4.4.5.1 Approved existing door assemblies on both ends of the bridge shall be permitted to swing out from the building.

7.2.4.4.5.2 The requirement of 7.2.4.4.5 shall not apply to existing bridges if the bridge has sufficient clear floor area to accommodate the occupant load of either connected building or fire area based on 3 ft^2 (0.28 m^2) per person.

7.2.4.4.5.3 The requirement of 7.2.4.4.5 shall not apply to horizontal exit door leaf swing as provided for the following:

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

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

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

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

7.2.5 Ramps.

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

7.2.5.2 Vehicle Ramps. Vehicle ramps in parking structures, as permitted in 42.8.2.2.6, and not an accessible means of egress or other accessible element, shall be exempt from the provisions of 7.2.5.

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

(1) New ramps shall be in accordance with Table 7.2.5.3(a), unless otherwise permitted by the following:
   (a) Table 7.2.5.3(a) shall not apply to industrial equipment access areas as provided in 40.2.5.3.
   (b) The maximum slope requirement shall not apply to ramps in assembly occupancies as provided in Chapter 12.
   (c) The maximum slope or maximum rise for a single ramp run shall not apply to ramps providing access to vehicles, vessels, mobile structures, and aircraft.
(2) Existing ramps shall be permitted to remain in use or be rebuilt, provided that they meet the requirements shown in Table 7.2.5.3(b), unless otherwise permitted by any of the following:
   (a) The requirements of Table 7.2.5.3(b) shall not apply to industrial equipment access areas as provided in 40.2.5.3.
   (b) The maximum slope or maximum height between landings for a single ramp run shall not apply to ramps providing access to vehicles, vessels, mobile structures, and aircraft.
   (c) Approved existing ramps with slopes not steeper than 1 in 6 shall be permitted to remain in use.
   (d) Existing ramps with slopes not steeper than 1 in 10 shall not be required to be provided with landings.

7.2.5.4 Ramp Details.

7.2.5.4.1 Construction. Ramp construction shall be as follows:

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

7.2.5.4.2 Landings. Ramp landings shall be as follows:

(1) Ramps shall have landings located at the top, at the bottom, and at door leaves opening onto the ramp.
(2) The slope of the landing shall be not steeper than 1 in 48.
(3) Every landing shall have a width not less than the width of the ramp.
(4) Every landing, except as otherwise provided in 7.2.5.4.2(5), shall be not less than 60 in. (1525 mm) long in the direction of travel, unless the landing is an approved existing landing.

Table 7.2.5.3(a) New Ramps

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

Table 7.2.5.3(b) Existing Ramps

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

(5) Where the ramp is not part of an accessible route, the ramp landings shall not be required to exceed 48 in. (1220 mm) in the direction of travel, provided that the ramp has a straight run.
(6) Any changes in travel direction shall be made only at landings, unless the ramp is an existing ramp.
(7) Ramps and intermediate landings shall continue with no decrease in width along the direction of egress travel.

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

7.2.5.5 Guards and Handrails.

7.2.5.5.1 Guards complying with 7.2.2.4 shall be provided for ramps, unless otherwise provided in 7.2.5.5.4.

7.2.5.5.2 Handrails complying with 7.2.2.4 shall be provided along both sides of a ramp run with a rise greater than 6 in. (150 mm), unless otherwise provided in 7.2.5.5.4.

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

7.2.5.5.4 The requirements of 7.2.5.5.1 and 7.2.5.5.2 shall not apply to guards and handrails provided for ramped aisles in assembly occupancies as otherwise provided in Chapters 12 and 13.

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

7.2.5.7 Special Provisions for Outside Ramps.

7.2.5.7.1* Visual Protection. Outside ramps shall be arranged to avoid any impediments to their use by persons having a fear of high places. Outside ramps more than 36 ft (11 m) above the finished ground level shall be provided with an opaque visual obstruction not less than 48 in. (1220 mm) in height.

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

7.2.6* Exit Passageways.

7.2.6.1* General. Exit passageways used as exit components shall conform to the general requirements of Section 7.1 and to the special requirements of 7.2.6.

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

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

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

7.2.6.4 Width.

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

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

7.2.6.4.2 In new construction, the minimum width of any exit passageway into which an exit stair discharges, or that serves as a horizontal transfer within an exit stair system, shall meet the following criteria:

(1) The minimum width of the exit passageway shall be not less than two-thirds of the width of the exit stair.
(2) Where stairs are credited with egress capacity in accordance with 7.3.3.2, the exit passageway width shall be sized to accommodate the same capacity as the stair, with such capacity determined by use of the capacity factors in Table 7.3.3.1.

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

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

7.2.8 Fire Escape Stairs.

7.2.8.1 General.

7.2.8.1.1 Where permitted in Chapters 11 through 43, fire escape stairs shall comply with the provisions of 7.2.8, unless they are approved existing fire escape stairs.

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

7.2.8.1.2.1 Fire escape stairs shall be permitted on existing buildings as provided in Chapters 11 through 43 but shall not constitute more than 50 percent of the required means of egress.

7.2.8.1.2.2 New fire escape stairs shall be permitted to be erected on existing buildings only where the authority having jurisdiction has determined that outside stairs are impractical. *(See 7.2.2.)*

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

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

buildings or erected independently of buildings and connected by walkways.

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

(1) Horizontally, within 15 ft (4570 mm) of any balcony, platform, or stairway constituting a component of the fire escape stair
(2) Below, within three stories or 36 ft (11 m) of any balcony, platform, walkway, or stairway constituting a component of the fire escape stair, or within two stories or 24 ft (7320 mm) of a platform or walkway leading from any story to the fire escape stair
(3) Above, within 10 ft (3050 mm) of any balcony, platform, or walkway, as measured vertically, or within 10 ft (3050 mm) of any stair tread surface, as measured vertically
(4) Facing a court served by a fire escape stair, where the least dimension of the court does not exceed one-third of the height to the uppermost platform of the fire escape stair, measured from the finished ground level
(5) Facing an alcove served by a fire escape stair, where the width of the alcove does not exceed one-third, or the depth of the alcove does not exceed one-fourth, of the height to the uppermost platform of the fire escape stair, measured from the finished ground level

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

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

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

7.2.8.3 Access.

7.2.8.3.1 Access to fire escape stairs shall be in accordance with 7.2.8.4 and 7.5.1.1.1 through 7.5.1.2.3.

7.2.8.3.2 Where access is permitted by way of windows, the windows shall be arranged and maintained so as to be easily opened. Screening or storm windows that restrict free access to the fire escape stair shall be prohibited.

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

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

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

7.2.8.4 Stair Details. Fire escape stairs shall comply with the requirements of Table 7.2.8.4(a). Replacement of fire escape stairs shall comply with the requirements of Table 7.2.8.4(b).

7.2.8.5 Guards, Handrails, and Visual Enclosures.

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

7.2.8.5.2 Replacement fire escape stairs in occupancies serving more than 10 occupants shall have visual enclosures to avoid any impediments to their use by persons having a fear of high places. Fire escape stairs more than 36 ft (11 m) above the finished ground level shall be provided with an opaque visual obstruction not less than 48 in. (1220 mm) in height.

7.2.8.6 Materials and Strength.

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

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

7.2.8.7* Swinging Stairs.

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

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

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

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

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

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

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

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

Table 7.2.8.4(a) Fire Escape Stairs

Feature	Serving More Than 10 Occupants	Serving 10 or Fewer Occupants
Minimum widths	22 in. (560 mm) clear between rails	18 in. (455 mm) clear between rails
Minimum horizontal dimension of any landing or platform	22 in. (560 mm) clear	18 in. (455 mm) clear
Maximum riser height	9 in. (230 mm)	12 in. (305 mm)
Minimum tread, exclusive of nosing	9 in. (230 mm)	6 in. (150 mm)
Minimum nosing or projection	1 in. (25 mm)	No requirement
Tread construction	Flat metal bars on edge or square bars secured against turning, spaced 1¼ in. (32 mm) maximum on centers	Flat metal bars on edge or square bars secured against turning, spaced 1¼ in. (32 mm) maximum on centers
Winders	None	Permitted subject to capacity penalty
Risers	None	No requirement
Spiral	None	Permitted subject to capacity penalty
Maximum height between landings	12 ft (3660 mm)	No requirement
Minimum headroom	6 ft 8 in. (2030 mm)	6 ft 8 in. (2030 mm)
Access to escape	Door or casement windows, 24 in. × 6 ft 8 in. (610 mm × 1980 mm); or double-hung windows, 30 in. × 36 in. (760 mm × 915 mm) clear opening	Windows providing a clear opening of at least 20 in. (510 mm) in width, 24 in. (610 mm) in height, and 5.7 ft^2 (0.53 m^2) in area
Level of access opening	Not over 12 in. (305 mm) above floor; steps if higher	Not over 12 in. (305 mm) above floor; steps if higher
Discharge to the finished ground level	Swinging stair section permitted if approved by authority having jurisdiction	Swinging stair, or ladder if approved by authority having jurisdiction
Capacity	½ in. (13 mm) per person, if access by door; 1 in. (25 mm) per person, if access by climbing over windowsill	10 persons; if winders or ladder from bottom balcony, 5 persons; if both, 1 person

Table 7.2.8.4(b) Replacement Fire Escape Stairs

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

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

7.2.8.8 Intervening Spaces.

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

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

7.2.9 Fire Escape Ladders.

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

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

7.2.9.2 Construction and Installation.

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

(1) Approved existing ladders complying with the edition of this *Code* that was in effect when the ladders were installed shall be permitted.
(2) Industrial stairs complying with the minimum requirements for fixed stairs of ANSI/ASSP A1264.1, *Safety Requirements for Workplace Walking/Working Surfaces and Their Access; Workplace Floor, Wall and Roof Openings; Stairs and Guardrail/Handrail Systems*, shall be permitted where fire escape ladders are permitted in accordance with Chapter 40.

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

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

7.2.10 Slide Escapes.

7.2.10.1 General.

7.2.10.1.1 A slide escape shall be permitted as a component in a means of egress where permitted in Chapters 11 through 43.

7.2.10.1.2 Each slide escape shall be of an approved type.

7.2.10.2 Capacity.

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

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

7.2.11* Alternating Tread Devices.

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

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

7.2.11.2 Alternating tread devices shall comply with all of the following:

(1) Handrails shall be provided on both sides of alternating tread devices in accordance with 7.2.2.4.4, except as provided in 7.2.11.3.
(2) The clear width between handrails shall be not less than 17 in. (430 mm) and not more than 24 in. (610 mm).
(3) Headroom shall be not less than 6 ft 8 in. (2030 mm).
(4) The angle of the device shall be between 50 degrees and 68 degrees to horizontal.
(5) The height of the riser shall not exceed 9½ in. (240 mm).
(6) Treads shall have a projected tread depth of not less than 5⅔ in. (145 mm), measured in accordance with 7.2.2, with each tread providing 9½ in. (240 mm) of depth, including tread overlap.
(7) A distance of not less than 6 in. (150 mm) shall be provided between the alternating tread device handrail and any other object.
(8) The initial tread of the alternating tread device shall begin at the same elevation as the platform, landing, or floor surface.
(9) The alternating treads shall not be laterally separated by a distance of more than 2 in. (51 mm).
(10) The occupant load served shall not exceed three.

7.2.11.3 Handrails of alternating tread devices shall comply with the following:

(1) The handrail height of alternating tread devices, measured above tread nosings, shall be uniform, not less than 30 in. (760 mm), and not more than 34 in. (865 mm).
(2) Handrails for alternating tread devices shall be permitted to terminate at a location vertically above the top and bottom risers.
(3) Handrails for alternating tread devices shall not be required to be continuous between flights or to extend beyond the top or bottom risers.
(4) Alternating tread device guards, with a top rail that also serves as a handrail, shall have a height of not less than 30 in. (760 mm), and not more than 34 in. (865 mm),

measured vertically from the leading edge of the device tread nosing.

(5) Open guards of alternating tread devices shall have rails such that a sphere 21 in. (535 mm) in diameter is not able to pass through any opening.

7.2.12 Areas of Refuge.

7.2.12.1 General.

7.2.12.1.1 An area of refuge used as part of a required accessible means of egress in accordance with 7.5.4; consisting of a story in a building that is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7; and having an accessible story that is one or more stories above or below a story of exit discharge shall meet the following criteria:

(1) Each elevator landing shall be provided with a two-way communication system for communication between the elevator landing and the fire command center or a central control point approved by the authority having jurisdiction.

(2) 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.

(3) The two-way communication system shall include both audible and visible signals.

7.2.12.1.2 An area of refuge used as part of a required accessible means of egress in accordance with 7.5.4 in other than a building that is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7 shall meet both of the following criteria:

(1) The area of refuge shall meet the general requirements of Section 7.1.

(2) The area of refuge shall meet the requirements of 7.2.12.2 and 7.2.12.3.

7.2.12.2 Accessibility.

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

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

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

(1) The minimum 48 in. (1220 mm) clear width shall not be required where the area of refuge is separated from the remainder of the story by a horizontal exit meeting the requirements of 7.2.4. *(See also 7.2.12.3.4.)*

(2) Existing stairs and landings that provide a clear width of not less than 37 in. (940 mm), measured at and below handrail height, shall be permitted.

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

(1) The elevator shall be approved for firefighters' emergency operations as provided in ASME A17.1/CSA B44, *Safety Code for Elevators and Escalators*.

(2) The power supply shall be protected against interruption from fire occurring within the building but outside the area of refuge.

(3) The elevator shall be located in a shaft system meeting the requirements for smokeproof enclosures in accordance with 7.2.3, unless otherwise provided in 7.2.12.2.4.1 and 7.2.12.2.4.2.

7.2.12.2.4.1 The smokeproof enclosure specified in 7.2.12.2.4(3) shall not be required for areas of refuge that are more than 1000 ft^2 (93 m^2) of clear floor area and that are created by a horizontal exit meeting the requirements of 7.2.4.

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

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

N **7.2.12.2.6** Newly installed two-way communication systems shall be listed in accordance with UL 2525, *Standard for Two-Way Emergency Communications Systems for Rescue Assistance*, and installed in accordance with *NFPA 72*.

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

7.2.12.3 Details.

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

7.2.12.3.2* For any area of refuge that does not exceed 1000 ft^2 (93 m^2) of clear floor area, it shall be demonstrated by calculation or test that tenable conditions are maintained within the area of refuge for a period of 15 minutes when the exposing space on the other side of the separation creating the area of refuge is subjected to the maximum expected fire conditions.

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

7.2.12.3.4* Each area of refuge shall be separated from the remainder of the story by a barrier having a minimum 1-hour fire resistance rating, unless one of the following criteria applies:

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

7.2.12.3.4.1 New fire door assemblies serving an area of refuge shall be smoke-leakage-rated in accordance with 8.2.2.4.

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

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

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

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

AREA OF REFUGE

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

(1) At each door opening providing access to the area of refuge
(2) At all exits not providing an accessible means of egress, as defined in 3.3.185.1
(3) Where necessary to indicate clearly the direction to an area of refuge

7.2.12.3.5.2 Signs required by 7.2.12.3.5 shall be illuminated as required for special signs in accordance with 7.10.8.1.

7.2.12.3.6 Tactile signage complying with ICC A117.1, *Accessible and Usable Buildings and Facilities*, shall be located at each door opening to an area of refuge.

7.2.13 Elevators in Towers.

7.2.13.1* General. An elevator complying with the requirements of Section 9.4 and 7.2.13 shall be permitted to be used as a second means of egress from a tower, as defined in 3.3.303, provided that all of the following criteria are met:

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

7.2.13.2 Elevator Evacuation System Capacity.

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

7.2.13.2.2 The elevator lobby shall have a minimum clear floor area capacity as follows:

(1) The elevator lobby clear floor area shall accommodate, at 3 ft^2 (0.28 m^2) per person, at least 50 percent of the occupant load of the floor area served by the lobby.
(2) The elevator lobby clear floor area shall also accommodate one wheelchair space of 30 in. × 48 in. (760 mm × 1220 mm) for each 50 persons, or portion thereof, of the occupant load of the floor area served by the lobby.

7.2.13.3 Elevator Lobby. Every floor served by the elevator shall have an elevator lobby. Barriers forming the elevator lobby shall have a minimum 1-hour fire resistance rating and shall be arranged as a smoke barrier in accordance with Section 8.5.

7.2.13.4 Elevator Lobby Door Assemblies. Elevator lobby door assemblies shall have a minimum 1-hour fire protection rating. The transmitted temperature end point shall not exceed 450°F Δ (250°C Δ) above ambient at the end of 30 minutes of the fire exposure specified in the test method referenced in 8.3.3.3. Elevator lobby door leaves shall be self-closing or automatic-closing in accordance with 7.2.1.8.

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

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

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

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

7.2.13.9* Elevator Operation. Elevators shall be provided with firefighters' emergency operations in accordance with ASME A17.1/CSA B44, *Safety Code for Elevators and Escalators*.

7.2.13.10 Maintenance. Where an elevator lobby is served by only one elevator car, the elevator evacuation system shall have a program of scheduled maintenance during times of building

shutdown or low building activity. Repairs shall be performed within 24 hours of breakdown.

7.2.13.11 Earthquake Protection. Elevators shall have the capability of orderly shutdowns during earthquakes at locations where such shutdowns are an option of ASME A17.1/CSA B44, *Safety Code for Elevators and Escalators.*

7.2.13.12 Signage. Signage shall comply with 7.10.8.4.

7.3 Capacity of Means of Egress.

7.3.1 Occupant Load.

7.3.1.1 Sufficient Capacity.

7.3.1.1.1 The total capacity of the means of egress for any story, balcony, tier, or other occupied space shall be sufficient for the occupant load thereof unless one of the following conditions exists:

(1) The authority having jurisdiction shall be permitted to establish the occupant load as the number of persons for which existing means of egress is adequate, provided that measures are established to prevent occupancy by a greater number of persons.
(2) The egress capacity shall have been previously approved as being adequate.

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

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

7.3.1.3 Occupant Load Increases.

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

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

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

Δ Table 7.3.1.2 Occupant Load Factor

Use	ft² per person[a]	m² per person[a]
Assembly Use		
Concentrated use, without fixed seating	7 net	0.65 net
Less concentrated use, without fixed seating	15 net	1.4 net
Bench-type seating	1 person/ 18 linear in.	1 person/ 455 linear mm
Fixed seating	Use number of fixed seats	Use number of fixed seats
Waiting spaces	See 12.1.7.2 and 13.1.7.2.	See 12.1.7.2 and 13.1.7.2.
Kitchens	100	9.3
Library stack areas	100	9.3
Library reading rooms	50 net	4.6 net
Swimming pools	50 (water surface)	4.6 (water surface)
Swimming pool decks	30	2.8
Exercise rooms with equipment	50	4.6
Exercise rooms without equipment	15	1.4
Stages	15 net	1.4 net
Lighting and access catwalks, galleries, gridirons	100 net	9.3 net
Casinos and similar gaming areas	11	1
Skating rinks	50	4.6
Business Use (other than below)	150	14
Concentrated business use[b]	50	4.6
Airport traffic control tower observation levels	40	3.7
Collaboration rooms/ spaces ≤450 ft² (41.8 m²) in area[b]	30	2.8
Collaboration rooms/ spaces >450 ft² (41.8 m²) in area[b]	15	1.4
Day-Care Use	35 net	3.3 net
Detention and Correctional Use	120	11.1
Educational Use		
Classrooms	20 net	1.9 net
Shops, laboratories, vocational rooms	50 net	4.6 net
Health Care Use		
Inpatient treatment departments	240	22.3
Sleeping departments	120	11.1
Ambulatory health care	150	14
Industrial Use		
General- and high-hazard industrial	100	9.3
Special-purpose industrial	MP	MP
Mercantile Use		
Sales area on street floor[c,d]	30	2.8

(continues)

Δ Table 7.3.1.2 *Continued*

Use	ft² per person[a]	m² per person[a]
Sales area on two or more street floors[d]	40	3.7
Sales area on floor below street floor[d]	30	2.8
Sales area on floors above street floor[d]	60	5.6
Floors or portions of floors used only for offices	See business use.	See business use.
Floors or portions of floors used only for storage, receiving, and shipping, and not open to general public	300	27.9
Mall structures[e]	Per factors applicable to use of space[f]	
Residential Use		
Hotels and dormitories	200	18.6
Apartment buildings	200	18.6
Board and care, large	200	18.6
Storage Use		
In storage occupancies	MP	MP
In mercantile occupancies	300	27.9
In other than storage and mercantile occupancies	500	46.5

MP: The occupant load is the maximum probable number of occupants present at any time.

[a]All factors are expressed in gross area unless marked "net."

[b]See A.7.3.1.2.

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

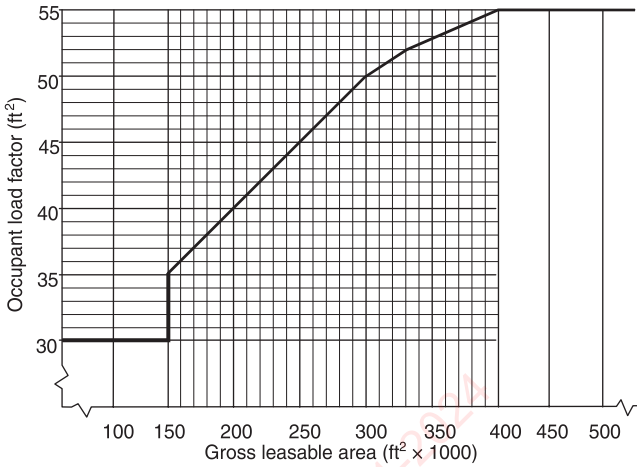
[d]For determining occupant load in mercantile occupancies with no street floor, as defined in 3.3.292, but with access directly from the street by stairs or escalators, the floor at the point of entrance to the mercantile occupancy is considered the street floor.

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

[f]The portions of the mall concourse not used as gross leasable area are not required to be assessed an occupant load based on Table 7.3.1.2. However, means of egress from a mall concourse are required to be provided for an occupant load determined by dividing the gross leasable area of the mall building (not including anchor buildings) by the appropriate lowest whole number occupant load factor from Figure 7.3.1.2(a) or Figure 7.3.1.2(b).

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

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



Δ FIGURE 7.3.1.2(a) Mall Structure Occupant Load Factors (US Customary Units).

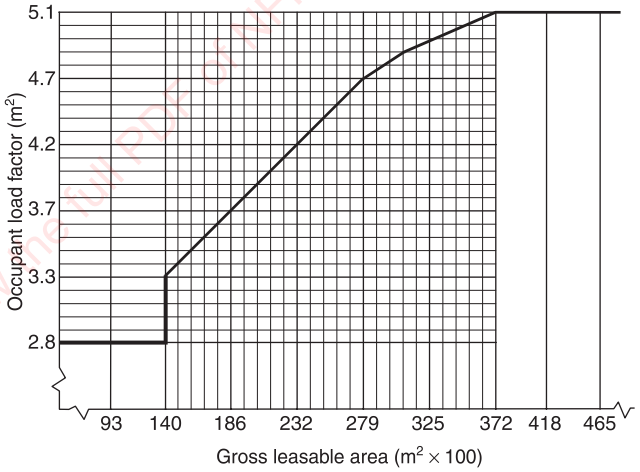


FIGURE 7.3.1.2(b) Mall Structure Occupant Load Factors (SI Units).

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

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

7.3.2 Measurement of Means of Egress.

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

7.3.2.2 Projections within the means of egress of not more than 4½ in. (114 mm) on each side shall be permitted at a height of 38 in. (965 mm) and below. In the case of stair and landing handrails forming part of a guard, in accordance with

Table 7.3.3.1 Capacity Factors

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

7.2.2.4.5.3, such projections shall be permitted at a height of 42 in. (1065 mm) and below.

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

7.3.3* Egress Capacity.

7.3.3.1 Egress capacity for approved components of means of egress shall be based on the capacity factors shown in Table 7.3.3.1, unless otherwise provided in 7.3.3.2.

7.3.3.2* For stairways wider than 44 in. (1120 mm) and subject to the 0.3 in. (7.6 mm) width per person capacity factor, the capacity shall be permitted to be increased using the following equation:

[7.3.3.2]

$$C = 146.7 + \left(\frac{Wn - 44}{0.218} \right)$$

where:
C = capacity, in persons, rounded to the nearest integer
Wn = nominal width of the stair as permitted by 7.3.2.2 (in.)

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

7.3.4 Minimum Width.

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

(1) Not less than that required for a given egress component in this chapter or Chapters 11 through 43
(2) Not less than 36 in. (915 mm) where another part of this chapter and Chapters 11 through 43 do not specify a minimum width

7.3.4.1.1* The width of exit access serving not more than six people and having a length not exceeding 50 ft (15 m) shall meet both of the following criteria:

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

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

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

(1) Doors as otherwise provided for in 7.2.1.2
(2) Aisles and aisle accessways in assembly occupancies as otherwise provided in Chapters 12 and 13
(3) Industrial equipment access as otherwise provided in 40.2.5.3

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

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

7.4* Number of Means of Egress.

7.4.1 General.

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

(1) A single means of egress shall be permitted where permitted in Chapters 11 through 43.
(2) A single means of egress shall be permitted for a mezzanine or balcony where the common path of travel limitations of Chapters 11 through 43 are met.

7.4.1.2 The number of means of egress from any story or portion thereof, other than for existing buildings as permitted in Chapters 11 through 43, shall be as follows:

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

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

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

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

7.4.1.6 Elevator Landing and Lobby Exit Access.

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

7.4.1.6.2 The elevator landing and lobby exit access required by 7.4.1.6.1 shall not require the use of a key, a tool, special knowledge, or special effort, unless permitted by 7.4.1.6.3.

7.4.1.6.3 Doors separating the elevator lobby from the exit access required by 7.4.1.6.1 shall be permitted to be electronically locked in accordance with 7.2.1.6.4.

7.4.2 Spaces About Electrical Equipment.

7.4.2.1 1000 Volts, Nominal, or Less.

7.4.2.1.1 Number of Means of Egress. The minimum number of means of egress for working space about electrical equipment, other than existing electrical equipment, shall be in accordance with 110.26(C) of *NFPA 70*.

7.4.2.1.2 Door Unlatching and Direction of Door Swing. The method of door unlatching and direction of door swing for working space about electrical equipment, other than existing electrical equipment, shall be in accordance with 110.26(C)(3) of *NFPA 70*.

7.4.2.2 Over 1000 Volts, Nominal.

7.4.2.2.1 Number of Means of Egress. The minimum number of means of egress for working space about electrical equipment, other than existing electrical equipment, shall be in accordance with 110.33(A) of *NFPA 70*.

7.4.2.2.2 Door Unlatching and Direction of Door Swing. The method of door unlatching and direction of door swing for working space about electrical equipment, other than existing electrical equipment, shall be in accordance with 110.33(A)(3) of *NFPA 70*.

7.5 Arrangement of Means of Egress.

7.5.1 General.

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

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

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

7.5.1.1.3 The requirements of 7.5.1.1.1 and 7.5.1.1.2 shall not apply where a single exit is permitted in Chapters 11 through 43.

7.5.1.1.4 Where common paths of travel are permitted for an occupancy in Chapters 11 through 43, such common paths of travel shall be permitted but shall not exceed the limit specified.

7.5.1.2 Corridors shall provide exit access without passing through any intervening rooms other than corridors, lobbies, and other spaces permitted to be open to the corridor, unless otherwise provided in 7.5.1.2.2 and 7.5.1.2.3.

7.5.1.2.1* Exit access shall be arranged so that there are no dead ends in corridors, unless permitted by, and limited to the lengths specified in, Chapters 11 through 43.

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

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

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

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

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

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

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

7.5.1.3.4* In other than high-rise buildings, where exit enclosures are provided as the required exits specified in 7.5.1.3.2 or 7.5.1.3.3 and are interconnected by not less than a 1-hour fire-resistance-rated corridor, exit separation shall be measured along the shortest line of travel within the corridor.

7.5.1.3.5 In existing buildings, where more than one exit, exit access, or exit discharge is required, such exits, exit accesses, or exit discharges shall be exempt from the diagonal measurement separation distance criteria of 7.5.1.3.2 and 7.5.1.3.3, provided that such exits, exit accesses, or exit discharges are remotely located in accordance with 7.5.1.3.1.

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

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

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

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

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

(1) They are enclosed in accordance with 7.1.3.2.
(2) They are separated from each other by 2-hour fire-resistance-rated noncombustible construction.
(3) No protected or unprotected penetrations or communicating openings exist between the stair enclosures.

7.5.1.5 Exit access from rooms or spaces shall be permitted to be through adjoining or intervening rooms or areas, provided that such rooms or areas are accessory to the area served. Foyers, lobbies, and reception rooms constructed as required for corridors shall not be construed as intervening rooms. Exit access shall be arranged so that it is not necessary to pass through any area identified under Protection from Hazards in Chapters 11 through 43.

7.5.2 Impediments to Egress. See also 7.1.9 and 7.2.1.5.

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

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

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

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

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

7.5.3 Exterior Ways of Exit Access.

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

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

7.5.3.3 Exterior exit access balconies shall be separated from the interior of the building by walls and opening protectives as required for corridors, unless the exterior exit access balcony is served by at least two remote stairs that can be accessed without any occupant traveling past an unprotected opening to reach one of the stairs, or unless dead ends on the exterior exit access do not exceed 20 ft (6100 mm).

7.5.3.4 Exterior exit access shall be arranged so that there are no dead ends in excess of those permitted for dead-end corridors in Chapters 11 through 43.

7.5.4 Accessible Means of Egress.

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

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

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

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

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

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

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

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

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

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

7.5.4.4 Where an exit stair is used in an accessible means of egress, it shall comply with 7.2.12 and either shall incorporate an area of refuge within an enlarged story-level landing or shall be accessed from an area of refuge.

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

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

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

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

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

7.6* Measurement of Travel Distance to Exits.

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

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

7.6.2 Where outside stairs that are not separated from the building are permitted as required exits, the travel distance shall be measured from the most remote point subject to occupancy to the leading nosing of the stair landing at the floor level under consideration.

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

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

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

7.6.6 The travel distance in any occupied space to not less than one exit, measured in accordance with 7.6.1 through 7.6.5, shall not exceed the limits specified in this *Code*. *(See 7.6.7.)*

7.6.7 Travel distance limitations shall be as provided in Chapters 11 through 43 and, for high hazard areas, shall be in accordance with Section 7.11.

7.7 Discharge from Exits.

7.7.1* Exit Termination. Exits shall terminate directly, at a public way or at an exterior exit discharge, unless otherwise provided in 7.7.1.3 through 7.7.1.5.

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

7.7.1.2 New exit discharge paths to a public way shall have a width of not less than 36 in. (915 mm) and existing exit discharge paths to a public way shall have a width of not less than 28 in. (710 mm).

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

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

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

Δ **7.7.2 Exit Discharge Through Interior Building Areas.** Exits shall be permitted to discharge through interior building areas, provided that all of the following are met:

(1) Not more than 50 percent of the required number of exit enclosures serving normally occupied areas of each floor, and not more than 50 percent of the exit enclosure capacity required for normally occupied areas of each floor, shall discharge through areas on any level of discharge, except as otherwise permitted by one of the following:
    (a) One hundred percent of the exits shall be permitted to discharge through areas on any level of discharge in detention and correctional occupancies as otherwise provided in Chapters 22 and 23.
    (b) In existing buildings, the 50 percent limit on egress capacity shall not apply if the 50 percent limit on the required number of exits is met.
    (c) Not more than 75 percent of the required number and capacity of exit stairs serving normally occupied areas of each floor shall be permitted to discharge through vestibules or foyers on any level of discharge where the level of discharge is protected throughout by an approved automatic sprinkler system in accordance with Section 9.7, and such vestibules or foyers meet the requirements of 7.7.2(3)(b).
(2) Each level of discharge shall discharge directly outside at the finished ground level or discharge directly outside and provide access to the finished ground level by outside stairs or outside ramps.
(3) The interior exit discharge shall be protected by one of the following methods:
    (a) The level of discharge shall be protected throughout by an approved automatic sprinkler system in accordance with Section 9.7, or the portion of the level of discharge used for interior exit discharge shall be protected by an approved automatic sprinkler system in accordance with Section 9.7 and shall be separated from the nonsprinklered portion of the floor by fire barriers with a fire resistance rating meeting the requirements for the enclosure of exits. *(See 7.1.3.2.1.)*
    (b) The interior exit discharge area shall be in a vestibule or foyer that meets all of the following criteria:
        i. The depth from the exterior of the building shall be not more than 10 ft (3050 mm), and the length shall be not more than 30 ft (9.1 m).
        ii. The foyer shall be separated from the remainder of the level of discharge by fire barriers with a minimum 1-hour fire resistance rating, and existing installations of wired glass in steel frames shall be permitted to be continued in use.
        iii. The foyer shall serve only as means of egress and shall include an exit directly to the outside.

(4) The interior exit discharge shall lead to a free and unobstructed way to the exterior of the building, and such way shall be readily apparent or shall be identifiable by exit signage from the point of discharge from the exit.
(5) The entire area on the level of discharge shall be separated from areas below by construction having a fire resistance rating not less than that required for the exit enclosure, unless otherwise provided in 7.7.2(6).
(6) Levels below the level of discharge in an atrium shall be permitted to be open to the level of discharge where such level of discharge is protected in accordance with 8.6.7.

7.7.3 Arrangement and Marking of Exit Discharge.

7.7.3.1 Where more than one exit discharge is required, exit discharges shall be arranged to meet the remoteness criteria of 7.5.1.3.

7.7.3.2 The exit discharge shall be arranged and marked to make clear the direction of egress travel from the exit discharge to a public way.

7.7.3.3* Stairs and ramps that continue more than one-half story below the level of discharge shall be provided with an approved means to prevent or dissuade occupants from traveling past the level of discharge during emergency building evacuation.

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

7.7.5 Signs. See 7.2.2.5.4.

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

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

7.8 Illumination of Means of Egress.

7.8.1 General.

7.8.1.1* Illumination of means of egress shall be provided in accordance with Section 7.8 for every building and structure where required in Chapters 11 through 43. For the purposes of this requirement, exit access shall include only designated stairs, aisles, corridors, ramps, escalators, and passageways leading to an exit. For the purposes of this requirement, exit discharge shall include only designated stairs, aisles, corridors, ramps, escalators, walkways, and passageways leading to a public way.

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

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

7.8.1.2.2* Unless prohibited by Chapters 11 through 43, automatic lighting control devices shall be permitted to temporarily turn off the illumination within the means of egress, provided that each lighting control device complies with all of the following:

(1) In new installations, the lighting control device is listed.
(2) The lighting control device is equipped to automatically energize any controlled lights required for compliance with Section 7.9 upon loss of normal power and is evaluated for this purpose.
(3) Illumination timers are provided and are set for a minimum 15-minute duration.
(4) The lighting control device is activated by any occupant movement in the area served by the lighting units.
(5) In new installations, the lighting control device is activated by activation of the building fire alarm system, if provided.
(6) The lighting control device does not turn off any lights relied upon for activation of photoluminescent exit signs or path markers.
(7) The lighting control device does not turn off any battery-equipped emergency luminaires, unit equipment, or exit signs.

7.8.1.2.3* Energy-saving sensors, switches, timers, or controllers shall be approved and shall not compromise the continuity of illumination of the means of egress required by 7.8.1.2.

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

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

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

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

7.8.2 Sources of Illumination.

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

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

7.9 Emergency Lighting.

7.9.1 General.

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

(1) Buildings or structures where required in Chapters 11 through 43
(2) Underground and limited-access structures as addressed in Section 11.7
(3) High-rise buildings as required by other sections of this *Code*
(4) Doors equipped with delayed-egress locks
(5) Stair shafts and vestibules of smokeproof enclosures, for which the following also apply:
    (a) The stair shaft and vestibule shall be permitted to include a standby generator that is installed for the smokeproof enclosure mechanical ventilation equipment.
    (b) The standby generator shall be permitted to be used for the stair shaft and vestibule emergency lighting power supply.
(6) New sensor-release of electrical locking systems in accordance with 7.2.1.6.2

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

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

7.9.2 Performance of System.

7.9.2.1 Emergency illumination shall be provided for a minimum of 1½ hours in the event of failure of normal lighting.

7.9.2.1.1 Emergency lighting facilities shall be arranged to provide initial illumination that is not less than an average of 1 foot-candle (10.8 lux) and, at any point, not less than 0.1 foot-candle (1.1 lux), measured along the path of egress at floor level.

7.9.2.1.2 Illumination levels shall be permitted to decline to not less than an average of 0.6 foot-candle (6.5 lux) and, at any point, not less than 0.06 foot-candle (0.65 lux) at the end of 1½ hours.

7.9.2.1.3 The maximum-to-minimum illumination shall not exceed a ratio of 40 to 1.

7.9.2.2 New emergency power systems for emergency lighting shall be at least Type 10, Class 1.5, Level 1, in accordance with NFPA 110.

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

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

7.9.2.4 Emergency generators and related transfer switch equipment that provide power to emergency lighting systems shall be installed, inspected, tested, and maintained in accordance with NFPA 110. Stored electrical energy systems, where required in this *Code*, other than battery systems for emergency luminaires in accordance with 7.9.2.5, shall be installed, inspected, tested, and maintained in accordance with NFPA 111.

7.9.2.5 Unit equipment, battery-equipped emergency luminaires, battery systems for emergency luminaires, and emergency lighting control devices shall be listed to UL 924, *Emergency Lighting and Power Equipment*.

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

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

7.9.3 Periodic Testing of Emergency Lighting Equipment.

7.9.3.1 Required emergency lighting systems shall be tested in accordance with one of the four options offered by 7.9.3.1.1, 7.9.3.1.2, 7.9.3.1.3, or 7.9.3.1.4.

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

(1) Functional testing shall be conducted monthly, with a minimum of 3 weeks and a maximum of 5 weeks between tests, for not less than 30 seconds, except as otherwise permitted by 7.9.3.1.1(2).
(2)* The test interval shall be permitted to be extended beyond 30 days with the approval of the authority having jurisdiction.
(3) Functional testing shall be conducted annually for a minimum of 1½ hours if the emergency lighting system is battery powered.
(4) The emergency lighting equipment shall be fully operational for the duration of the tests required by 7.9.3.1.1(1) and 7.9.3.1.1(3).
(5) Written records of visual inspections and tests shall be kept by the owner for inspection by the authority having jurisdiction.

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

(1) Self-testing/self-diagnostic battery-operated emergency lighting equipment shall be provided.
(2) Not less than once every 30 days, self-testing/self-diagnostic battery-operated emergency lighting equipment shall automatically perform a test with a duration of a minimum of 30 seconds and a diagnostic routine.
(3) Self-testing/self-diagnostic battery-operated emergency lighting equipment shall indicate failures by a status indicator.
(4) A visual inspection shall be performed at intervals not exceeding 30 days.
(5) Functional testing shall be conducted annually for a minimum of 1½ hours.
(6) Self-testing/self-diagnostic battery-operated emergency lighting equipment shall be fully operational for the duration of the 1½-hour test.

(7) Written records of visual inspections and tests shall be kept by the owner for inspection by the authority having jurisdiction.

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

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

7.9.3.1.4 Testing of required emergency lighting systems shall be permitted to be conducted in accordance with 7.9.2.4.

7.10 Marking of Means of Egress.

7.10.1 General.

7.10.1.1 Where Required. Means of egress shall be marked in accordance with Section 7.10 where required in Chapters 11 through 43.

7.10.1.2 Exits.

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

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

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

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

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

7.10.1.5 Exit Access.

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

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

7.10.1.6* Floor Proximity Exit Signs. Where floor proximity exit signs are required in Chapters 11 through 43, such signs shall comply with 7.10.3, 7.10.4, 7.10.5, and 7.10.6 for externally illuminated signs and 7.10.7 for internally illuminated signs. Such signs shall be located near the floor level in addition to those signs required for doors or corridors. The bottom of the sign shall be not less than 6 in. (150 mm), but not more than 18 in. (455 mm), above the floor. For exit doors, the sign shall be mounted on the door or adjacent to the door, with the nearest edge of the sign within 4 in. (100 mm) of the door frame.

7.10.1.7* Floor Proximity Egress Path Marking. Where floor proximity egress path marking is required in Chapters 11 through 43, an approved floor proximity egress path marking system that is internally illuminated shall be installed within 18 in. (455 mm) of the floor. Floor proximity egress path marking systems shall be listed in accordance with UL 1994, *Luminous Egress Path Marking Systems*. The system shall provide a visible delineation of the path of travel along the designated exit access and shall be essentially continuous, except as interrupted by doorways, hallways, corridors, or other such architectural features. The system shall operate continuously or at any time the building fire alarm system is activated. The activation, duration, and continuity of operation of the system shall be in accordance with 7.9.2. The system shall be maintained in accordance with the product manufacturing listing.

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

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

7.10.2* Directional Signs.

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

7.10.2.2 Directional exit signs shall be provided within horizontal components of the egress path within exit enclosures as required by 7.10.1.2.2.

7.10.3* Sign Legend.

7.10.3.1 Signs required by 7.10.1 and 7.10.2 shall read as follows in plainly legible letters, or other appropriate wording shall be used:

EXIT

7.10.3.2* Where approved by the authority having jurisdiction, pictograms in compliance with NFPA 170 shall be permitted.

7.10.4* Power Source. Where emergency lighting facilities are required by the applicable provisions of Chapters 11 through 43 for individual occupancies, the signs, other than approved self-luminous signs and listed photoluminescent signs in accordance with 7.10.7.2, shall be illuminated by the emergency lighting facilities. The level of illumination of the signs shall be in accordance with 7.10.6.3 or 7.10.7 for the required emergency lighting duration as specified in 7.9.2.1. However, the level of illumination shall be permitted to decline to 60 percent at the end of the emergency lighting duration.

7.10.5 Illumination of Signs.

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

7.10.5.2* Continuous Illumination.

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

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

7.10.6 Externally Illuminated Signs.

7.10.6.1* Size of Signs.

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

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

7.10.6.1.2 The requirements of 7.10.6.1.1 shall not apply to marking required by 7.10.1.3 and 7.10.1.7.

7.10.6.2* Size and Location of Directional Indicator.

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

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

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

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

7.10.7 Internally Illuminated Signs.

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

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

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

7.10.8 Special Signs.

7.10.8.1 Sign Illumination.

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

7.10.8.1.2 Where emergency lighting facilities are required by the applicable provisions of Chapters 11 through 43, the required illumination of special signs shall additionally be provided under emergency lighting conditions.

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

7.10.8.3* No Exit.

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

NO

EXIT

FIGURE 7.10.6.2.1 Chevron-Type Indicator.

7.10.8.3.2 For other than previously approved existing NO EXIT signs, the sign shall comply with all of the following:

(1) The word NO shall be in letters not less than 2 in. (51 mm) high, with a stroke width of not less than 3⁄8 in. (9.5 mm).
(2) The word EXIT shall be in letters not less than 1 in. (25 mm) high.
(3) Larger signs shall retain the same letter-height-to-stroke-width ratio for the word NO and a 2:1 letter-height ratio between the words NO and EXIT.
(4) The word EXIT shall be located below the word NO.

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

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

7.10.8.5* Evacuation Diagram. Where a posted floor evacuation diagram is required in Chapters 11 through 43, floor evacuation diagrams reflecting the actual floor arrangement and exit locations shall be posted and oriented in a location and manner acceptable to the authority having jurisdiction.

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

7.11 Special Provisions for Occupancies with High-Hazard Contents. See Section 6.2.

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

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

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

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

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

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

7.11.6 Doors serving high-hazard content areas shall swing in the direction of egress travel.

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

7.12* Special Provisions for Hazardous Materials.

7.12.1 Hazardous materials that are stored, used, or handled, and that are also classified as high-hazard contents in accordance with 6.2.2, shall comply with Section 7.11.

7.12.2 Where required by the provisions of Chapter 11 through 43, occupancies with hazardous materials shall comply with both of the following:

(1) Means of egress requirements of this *Code*
(2) Applicable means of egress requirements of NFPA 30, NFPA 45, NFPA 55, NFPA 58, NFPA 400, and NFPA 495 that are stricter than the means of egress requirements of this *Code*

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

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

(1) A common path of travel not exceeding 100 ft (30 m) shall be permitted in any of the following locations:
    (a) In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7
    (b) In mechanical equipment rooms with no fuel-fired equipment
    (c) In existing buildings
(2) In an existing building, a common path of travel not exceeding 150 ft (46 m) shall be permitted, provided that all of the following criteria are met:
    (a) The building is protected throughout by an approved, supervised automatic sprinkler system installed in accordance with Section 9.7.
    (b) No fuel-fired equipment is within the space.
    (c) The egress path is readily identifiable.
(3) The requirement of 7.13.1 shall not apply to rooms or spaces in existing health care occupancies complying with the arrangement of means of egress provisions of 19.2.5 and the travel distance limits of 19.2.6.

7.13.2 Stories used exclusively for mechanical equipment, furnaces, or boilers shall be permitted to have a single means of egress where the travel distance to an exit on that story is not in excess of the common path of travel limitations of 7.13.1.

7.14 Normally Unoccupied Building Service Equipment Support Areas.

7.14.1* Hazard of Contents.

7.14.1.1 Unless prohibited by Chapters 11 through 43, the provisions of Section 7.14 shall apply, in lieu of the provisions of Sections 7.1 through 7.13, to normally unoccupied building service equipment support areas where such areas do not contain high-hazard contents or operations.

7.14.1.2 Building service equipment support areas shall not contain fuel-fired equipment or be used for the storage of combustibles.

7.14.2 Egress Doors.

7.14.2.1* Egress from normally unoccupied building service equipment support areas shall be provided by doors complying with 7.2.1 where the normally unoccupied building service equipment support area exceeds 45,000 ft^2 (4180 m^2) in buildings not protected throughout by an approved, supervised automatic sprinkler system in accordance with 9.7.1.1(1).

7.14.2.2 Egress from normally unoccupied building service equipment support areas shall be provided by doors complying with 7.2.1 where the normally unoccupied building service equipment support area exceeds 90,000 ft^2 (8370 m^2) in buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 9.7.1.1(1).

Δ **7.14.2.3** The absence of sprinklers in the normally unoccupied building service equipment support area, as permitted by NFPA 13, shall not cause a building to be classified as nonsprinklered for purposes of applying the provisions of 7.14.2.2.

7.14.3 Means of Egress Path.

7.14.3.1 A designated means of egress path shall be provided within the normally unoccupied building service equipment support area where the normally unoccupied area exceeds 45,000 ft^2 (4180 m^2) in buildings not protected throughout by an approved, supervised automatic sprinkler system in accordance with 9.7.1.1(1).

7.14.3.2 A designated means of egress path shall be provided within the normally unoccupied building service equipment support area where the normally unoccupied area exceeds 90,000 ft^2 (8370 m^2) in buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 9.7.1.1(1).

Δ **7.14.3.3** The absence of sprinklers in the normally unoccupied building service equipment support area, as permitted by NFPA 13, shall not cause a building to be classified as nonsprinklered for purposes of applying the provisions of 7.14.3.2.

7.14.3.4 Where a means of egress path is required, the path shall be a minimum of 28 in. (710 mm) clear width.

7.14.3.5 Where a means of egress path is required, minimum headroom shall be 6 ft 8 in. (2030 mm) along the entire designated means of egress path.

7.14.3.6 Exit signage shall not be required along the means of egress path within normally unoccupied building service equipment support areas.

7.14.3.7 Where two means of egress are required, the means of egress path shall connect the two required means of egress.

7.14.3.8 The designated means of egress path shall be within 25 ft (7.6 m) of any portion of the space where the only available access requires crossing over or under obstructions, unless the space is completely inaccessible.

7.14.4 Illumination.

7.14.4.1 The minimum illumination of means of egress along the required means of egress path shall be 0.2 foot-candle (2.2 lux), except as otherwise provided in 7.14.4.2.

7.14.4.2 Illumination of means of egress shall not be required in normally unoccupied building service equipment support areas where illumination of means of egress is not required by the applicable occupancy chapter for the remainder of the building.

7.14.5 Number of Means of Egress.

7.14.5.1 Two remotely located means of egress shall be provided within the normally unoccupied building service equipment support area where the normally unoccupied area exceeds 45,000 ft^2 (4180 m^2) in buildings not protected throughout by an approved, supervised automatic sprinkler system in accordance with 9.7.1.1(1).

7.14.5.2 Two remotely located means of egress shall be provided within the normally unoccupied building service equipment support area where the normally unoccupied area exceeds 90,000 ft^2 (8370 m^2) in buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 9.7.1.1(1).

Δ **7.14.5.3** The absence of sprinklers in the normally unoccupied building service equipment support area, as permitted by NFPA 13, shall not cause a building to be classified as nonsprinklered for purposes of applying the provisions of 7.14.5.2.

7.15 Occupant Evacuation Elevators.

7.15.1 General.

7.15.1.1* Where passenger elevators for general public use are permitted to be used for occupant evacuation prior to Phase I Emergency Recall Operation mandated by the firefighters' emergency operation provisions of ASME A17.1/CSA B44, *Safety Code for Elevators and Escalators*, the elevator system shall also comply with this section, except as otherwise permitted by 7.15.1.2.

7.15.1.2 The provisions of Section 7.15 shall not apply where the limited or supervised use of elevators for evacuation is part of a formal or informal evacuation strategy, including the relocation or evacuation of patients in health care occupancies and the relocation or evacuation of occupants with disabilities in other occupancies.

7.15.1.3* The occupant evacuation elevators shall be in accordance with the occupant evacuation operation (OEO) requirements of ASME A17.1/CSA B44, *Safety Code for Elevators and Escalators,* and the building emergency action plan required by 7.15.3.1.

7.15.1.4 Occupant evacuation elevators in accordance with Section 7.15 shall not be permitted to satisfy requirements of this *Code* applicable to the following:

(1) Number of means of egress
(2) Capacity of means of egress
(3) Arrangement of means of egress

7.15.2 Reserved.

7.15.3 Information Features.

7.15.3.1* An emergency action plan approved by the authority having jurisdiction shall be implemented, specifically including the procedures for occupant evacuation using the exit stairs and the occupant evacuation elevators.

7.15.3.2 Occupant evacuation elevators shall be marked with signage indicating the elevators are suitable for use by building occupants for evacuation during fires.

 Shaded text = Revisions. Δ = Text deletions and figure/table revisions. • = Section deletions. *N* = New material.

7.15.3.3 Conditions for Safe Continued Operation.

Δ **7.15.3.3.1** Conditions necessary for the continued safe operation of the occupant evacuation elevators and the associated elevator lobbies and elevator machine rooms shall be continuously monitored and displayed at the building fire command center.

7.15.3.3.2 The monitoring and display required by 7.15.3.3.1 shall include all of the following:

(1) Floor location of each elevator car
(2) Direction of travel of each elevator car
(3) Status of each elevator car with respect to whether it is occupied
(4) Status of normal power to the elevator equipment, elevator controller cooling equipment, and elevator machine room ventilation and cooling equipment
(5) Status of standby or emergency power system that provides backup power to the elevator equipment, elevator controller cooling equipment, and elevator machine/control room or machinery/control space ventilation and cooling equipment
(6) Activation of any fire alarm–initiating device in any elevator lobby, elevator machine/control room or machinery/control space, or elevator hoistway

7.15.3.4 The building fire command center location specified in 7.15.3.3.1 shall be provided with a means to override normal elevator operation and to initiate manually a Phase I emergency recall operation of the occupant evacuation elevators in accordance with ASME A17.1/CSA B44, *Safety Code for Elevators and Escalators*.

7.15.4 Fire Detection, Alarm, and Communication.

7.15.4.1 The building shall be protected throughout by an approved fire alarm system in accordance with Section 9.6.

7.15.4.2* The fire alarm system shall include an emergency voice/alarm communication system in accordance with *NFPA 72* with the ability to provide voice directions on a selective basis to any building floor.

7.15.4.3* The emergency voice/alarm communication system shall be arranged so that intelligible voice instructions are audible in the elevator lobbies under conditions where the elevator lobby doors are in the closed position.

7.15.4.4 Two-way Communication System. A two-way communication system shall be provided in each occupant evacuation elevator lobby for initiating communication with the fire command center or an alternative location approved by the fire department.

7.15.4.4.1 Design and Installation. The two-way communication system shall include audible and visible signals and shall be designed and installed in accordance with the requirements of ICC A117.1, *Accessible and Usable Buildings and Facilities*.

7.15.4.4.2 Instructions.

7.15.4.4.2.1 Instructions for the use of the two-way communication system, along with the location of the station, shall be permanently located adjacent to each station.

7.15.4.4.2.2 Signage for instructions shall comply with the requirements of ICC A117.1, *Accessible and Usable Buildings and Facilities*, for visual characters.

7.15.5 Sprinklers.

7.15.5.1 The building shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with 9.7.1.1(1), except as otherwise specified in 7.15.5.1.1 through 7.15.5.3.

7.15.5.1.1 A sprinkler control valve and a waterflow device shall be provided for each floor.

7.15.5.1.2 The sprinkler control valves and waterflow devices required by 7.15.5.1.1 shall be monitored by the building fire alarm system.

7.15.5.2* Sprinklers shall not be installed in elevator machine/control rooms and machinery/control spaces serving occupant evacuation elevators, and such prohibition shall not cause an otherwise fully sprinklered building to be classified as nonsprinklered.

7.15.5.3* Where a hoistway serves occupant evacuation elevators, sprinklers shall not be installed at the top of the elevator hoistway or at other points in the hoistway more than 24 in. (610 mm) above the pit floor, and such prohibition shall not cause the building to be classified as nonsprinklered.

7.15.6 Elevator Installation.

7.15.6.1 Except as modified by 7.15.6.2 and 7.15.6.3, occupant evacuation elevators shall be installed in accordance with ASME A17.1/CSA B44, *Safety Code for Elevators and Escalators*, including the provisions for occupant evacuation operation, as required by 7.15.1.3.

7.15.6.2* Shunt breakers shall not be installed on elevator systems used for occupant evacuation.

7.15.6.3 Occupant evacuation elevators shall be limited to electric passenger elevators that are located in noncombustible hoistways and for which the car enclosure materials meet the requirements of ASME A17.1/CSA B44, *Safety Code for Elevators and Escalators*.

7.15.7 Elevator Machine/Control Rooms and Machinery/Control Spaces.

7.15.7.1* Elevator machine/control rooms and machinery/control spaces associated with occupant evacuation elevators shall be separated from all building areas, other than elevator hoistways, by minimum 2-hour fire-resistance-rated construction.

7.15.7.2* Elevator machine/control rooms and machinery/control spaces associated with occupant evacuation elevators shall be used for no purpose other than elevator machine/control rooms and machinery/control spaces.

7.15.8 Electrical Power and Control Wiring.

7.15.8.1 The following features associated with occupant evacuation elevators shall be supplied by both normal power and Type 60, Class 2, Level 1 standby power:

(1) Elevator equipment
(2) Ventilation and cooling equipment for elevator machine/control rooms and machinery/control spaces
(3) Elevator car lighting

7.15.8.2 Wires or cables that are located outside elevator hoistways, machine/control rooms, and machinery/control spaces, and that provide normal power, standby power, control signals,

communication with the cars, lighting, heating, air-conditioning, ventilation, and fire detecting systems to occupant evacuation elevators shall be protected by one of the following means, except as otherwise provided in 7.15.8.3:

(1) The wiring shall utilize Type CI cable with a minimum 2-hour fire resistance rating.
(2) The wiring shall be enclosed in a minimum 2-hour fire-resistance-rated construction.
(3) The wiring shall be wiring that is approved as providing a 2-hour performance alternative.

7.15.8.3* Control signaling wiring and cables that do not serve Phase II emergency in-car service shall not be required to be protected.

7.15.9 Occupant Evacuation Shaft System.

Δ **7.15.9.1** Occupant evacuation elevators, except those that service only an open parking garage, shall be provided with an occupant evacuation shaft system consisting of all of the following:

(1) Elevator hoistway
(2) Enclosed elevator lobby outside the bank or group of hoistway doors on each floor served by the elevators, except that elevator lobbies are not required to be enclosed where located either on the street floor or on the level of exit discharge
(3) Enclosed exit stair with doors to all floors, at and above grade level, served by the elevators

7.15.9.2* Elevator Lobby Size.

7.15.9.2.1 Occupant evacuation elevator lobbies shall have minimum clear floor area, except as otherwise provided in 7.15.9.2.2, as follows:

(1) The elevator lobby clear floor area shall accommodate, at 3 ft^2 (0.28 m^2) per person, a minimum of 25 percent of the occupant load of the floor area served by the lobby.
(2) The elevator lobby clear floor area also shall accommodate one wheelchair space of 30 in. × 48 in. (760 mm × 1220 mm) for each 50 persons, or portion thereof, of the occupant load of the floor area served by the lobby.

7.15.9.2.2 The size of lobbies serving multiple banks of elevators shall be exempt from the requirement of 7.15.9.2.1(1), provided that the area of such lobbies is approved on an individual basis and is consistent with the building's emergency action plan.

7.15.9.3 Access to the exit stair required by 7.15.9.1(3) shall be directly from the enclosed elevator lobby on each floor, except the floor that is at the lobby of the building.

7.15.9.4 The occupant evacuation shaft system shall be enclosed and separated from the remainder of the building by walls complying with the following:

(1) The shaft system walls shall be smoke barriers in accordance with Section 8.5.
(2) The shaft system walls separating the elevator lobby from the remainder of the building shall have a minimum 1-hour fire resistance rating and minimum ¾-hour fire-protection-rated opening protectives.
(3) The shaft system walls separating the elevator hoistway from the remainder of the building shall have a minimum 2-hour fire resistance rating and minimum 1½-hour fire-protection-rated opening protectives.
(4) The shaft system walls separating the enclosed exit stair from the remainder of the building shall have a minimum 2-hour fire resistance rating and minimum 1½-hour fire-protection-rated opening protectives.

7.15.9.5 Occupant evacuation shaft system enclosures shall be constructed to provide a minimum of classification Level 2 in accordance with ASTM C1629/C1629M, *Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels*.

7.15.9.6* An approved method to prevent water from infiltrating into the hoistway enclosure from the operation of the automatic sprinkler system outside the enclosed occupant evacuation elevator lobby shall be provided.

7.15.9.7 Occupant evacuation shaft system elevator lobby doors, other than doors to the hoistway, exit stair enclosure, control room, or control space, shall have all of the following features:

(1) The doors shall have a fire protection rating of not less than ¾ hour.
(2) The doors shall be smoke-leakage-rated assemblies in accordance with NFPA 105.
(3) The doors shall have an automatic positioning bottom seal to resist the passage of water at floor level from outside the shaft system.

7.15.9.8 Occupant evacuation shaft system elevator lobby doors shall have the following features:

(1) Each door, other than doors to the hoistway, exit stair enclosure, control room, or control space, shall be automatic-closing in accordance with 7.2.1.8.2, as modified by 7.15.9.8(2).
(2) In addition to the automatic-closing means addressed by 7.2.1.8.2, the elevator lobby door on any floor shall also close in response to any alarm signal initiated on that floor.
(3) Each door shall be provided with a vision panel arranged to allow people on either side of the door to view conditions on the other side of the door.

7.15.9.9 Each occupant evacuation shaft system exit stair enclosure door shall be provided with a vision panel arranged to allow people on either side of the door to view conditions on the other side of the door.

7.16* Emergency Stair Travel Devices. Where newly installed emergency stair travel devices are provided, they shall comply with ANSI/RESNA ED-1, *Emergency Stair Travel Devices Used by Individuals with Disabilities*.

Chapter 8 Features of Fire Protection

8.1 General.

8.1.1 Application. The features of fire protection set forth in this chapter shall apply to both new construction and existing buildings.

8.1.2 Automatic Sprinkler Systems. Where another provision of this chapter requires an automatic sprinkler system, the automatic sprinkler system shall be installed in accordance with the subparts of 9.7.1.1, as permitted by the applicable occupancy chapter.

8.2 Construction and Compartmentation.

8.2.1 Construction.

8.2.1.1 Buildings or structures occupied or used in accordance with the individual occupancy chapters, Chapters 11 through 43, shall meet the minimum construction requirements of those chapters.

8.2.1.2* NFPA 220 shall be used to determine the requirements for the construction classification.

8.2.1.3 Where the building or facility includes additions or connected structures of different construction types, the rating and classification of the structure shall be based on one of the following:

(1) Separate buildings, if a 2-hour or greater vertically aligned fire barrier wall in accordance with NFPA 221 exists between the portions of the building
(2) Separate buildings, if provided with previously approved separations
(3) Least fire-resistive construction type of the connected portions, if separation as specified in 8.2.1.3(1) or 8.2.1.3(2) is not provided
(4) Separate vertical buildings, where permitted by NFPA 221

8.2.2 General.

8.2.2.1 Where required by other chapters of this *Code*, every building shall be divided into compartments to limit the spread of fire and restrict the movement of smoke.

8.2.2.2 Fire compartments shall be formed with fire barriers that comply with Section 8.3.

8.2.2.3 Smoke compartments shall be formed with smoke barriers that comply with Section 8.5.

8.2.2.4 Where door assemblies are required elsewhere in this *Code* to be smoke-leakage-rated in accordance with 8.2.2.4, door assemblies shall comply with all of the following:

(1) They shall be tested in accordance with UL 1784, *Air Leakage Tests of Door Assemblies and Other Opening Protectives.*
(2) The maximum air leakage rate of the door assembly shall be 3.0 $ft^3/min/ft^2$ (0.9 $m^3/min/m^2$) of door opening at 0.10 in. water column (25 N/m^2) for both the ambient and elevated temperature tests.
(3) Door assemblies shall be installed and maintained in accordance with NFPA 105.

8.2.2.5* Wall Marking and Identification. For other than existing assemblies, where there is an accessible concealed floor, floor/ceiling, or attic space, fire barriers, smoke barriers, and smoke partitions shall be permanently identified with signs or stenciling in the concealed space and shall comply with all of the following:

(1) Be located in accessible concealed floor, floor/ceiling, or attic spaces
(2) Be located within 15 ft (4572 mm) of the end of each wall and at intervals not exceeding 30 ft (9144 mm) measured horizontally along the wall or partition
(3) Include lettering not less than 3 in. (76 mm) in height with a minimum ⅜ in. (9.5 mm) stroke in a contrasting color
(4) Identify the wall type and its fire resistance rating, as applicable

8.2.3 Fire-Resistance-Rated Construction.

8.2.3.1* The fire resistance of structural elements and building assemblies shall be determined in accordance with test procedures set forth in ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, or UL 263, *Fire Tests of Building Construction and Materials*; other approved test methods; or analytical methods approved by the authority having jurisdiction.

8.2.3.1.1 Materials used to construct fire-resistance-rated elements and assemblies shall be limited to those permitted in this *Code* and installed to the manufacturer's installation instructions or listed designs.

8.2.3.1.2 In new construction, end-jointed lumber used in an assembly required to have a fire resistance rating shall have the designation "Heat Resistant Adhesive" or "HRA" included in its grade mark.

8.2.3.2 Fire-resistance-rated floor and roof assemblies shall be classified as restrained or unrestrained in accordance with ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, or UL 263, *Fire Tests of Building Construction and Materials*; or other approved test methods. The construction shall be considered restrained only where a registered design professional has furnished the authority having jurisdiction with satisfactory documentation verifying that the construction is restrained. The classification of fire-resistance-rated floor and roof construction shall be identified on the plans as restrained or unrestrained.

8.2.3.3 Structural elements that support fire barriers shall be permitted to have only the fire resistance rating required for the construction classification of the building, provided that both of the following criteria are met:

(1) Such structural elements support nonbearing wall or partition assemblies that have a required 1-hour fire resistance rating or less.
(2) Such structural elements do not serve as exit enclosures or protection for vertical openings.

8.2.3.4 The requirement of 8.2.3.3 shall not apply to health care occupancy structural elements supporting floor assemblies in accordance with the provisions of 18.1.6 and 19.1.6.

8.2.4* Analytical Methods.

8.2.4.1 Analytical methods utilized to determine the fire resistance rating of building assemblies shall comply with 8.2.4.2 through 8.2.4.5.

8.2.4.2* Where calculations are used to establish the fire resistance rating of structural elements or assemblies, they shall

be permitted to be performed in accordance with ASCE/SEI/SFPE 29, *Standard Calculation Methods for Structural Fire Protection*.

Δ **8.2.4.3** Where calculations are used to establish the fire resistance rating of concrete or masonry elements or assemblies, the provisions of ACI 216.1, *Code Requirements for Determining Fire Resistance of Concrete and Masonry Construction Assemblies*, shall be permitted to be used.

8.2.4.4 Except for the methods specified in 8.2.4.2 and 8.2.4.3, analytical methods used to calculate the fire resistance of building assemblies or structural elements shall be approved.

8.2.4.5 Where an approved analytical method is utilized to establish the fire resistance rating of a structural element or building assembly, the calculations shall be based upon the fire exposure and acceptance criteria specified in ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, or UL 263, *Fire Tests of Building Construction and Materials*.

8.3 Fire Barriers.

8.3.1 General.

8.3.1.1 Fire barriers used to provide enclosure, subdivision, or protection under this *Code* shall be classified in accordance with one of the following fire resistance ratings:

(1) 3-hour fire resistance rating
(2) 2-hour fire resistance rating
(3) 1-hour fire resistance rating
(4)* ½-hour fire resistance rating

8.3.1.2* Fire barriers shall comply with one of the following:

(1) The fire barriers are continuous from outside wall to outside wall or from one fire barrier to another, or a combination thereof, including continuity through all concealed spaces, such as those found above a ceiling, including interstitial spaces.
(2) The fire barriers are continuous from outside wall to outside wall or from one fire barrier to another, and from the floor to the bottom of the interstitial space, provided that the construction assembly forming the bottom of the interstitial space has a fire resistance rating not less than that of the fire barrier.

8.3.1.3 Walls used as fire barriers shall comply with the requirements of NFPA 221 applicable to fire barrier walls.

8.3.1.4 Smoke Barrier Used as a Fire Barrier. A smoke barrier shall be permitted to be used as a fire barrier, provided that it meets the requirements of Section 8.3.

8.3.2 Walls.

8.3.2.1 The fire-resistive materials, assemblies, and systems used shall be limited to those permitted in this *Code* and this chapter.

8.3.2.1.1* Fire resistance glazing tested in accordance with ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, or UL 263, *Fire Tests of Building Construction and Materials*, shall be permitted.

8.3.2.2 The construction materials and details for fire-resistive assemblies and systems for walls described shall comply with all other provisions of this *Code*, except as modified herein.

8.3.2.3 Interior walls and partitions of nonsymmetrical construction shall be evaluated from both directions and assigned a fire resistance rating based on the shorter duration obtained in accordance with ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, or UL 263, *Fire Tests of Building Construction and Materials*. When the wall is tested with the least fire-resistive side exposed to the furnace, the wall shall not be required to be subjected to tests from the opposite side.

8.3.3 Opening Protectives.

8.3.3.1 General. Every opening in a fire barrier shall be protected to limit the spread of fire from one side of the fire barrier to the other.

8.3.3.2 Minimum Fire Protection Rating.

8.3.3.2.1* Fire protection ratings for products required to comply with 8.3.3 shall be as determined and reported by a nationally recognized testing agency in accordance with NFPA 252; NFPA 257; UL 10B, *Fire Tests of Door Assemblies*; UL 10C, *Positive Pressure Fire Tests of Door Assemblies*; or UL 9, *Fire Tests of Window Assemblies*.

8.3.3.2.2* The minimum fire rating for opening protectives in fire barriers, fire-rated smoke barriers, and fire-rated smoke partitions shall be in accordance with Table 8.3.3.2.2, except as otherwise permitted in 8.3.3.2.3 or 8.3.3.2.4.

8.3.3.2.3 Existing fire door assemblies having a minimum ¾-hour fire protection rating shall be permitted to continue to be used in vertical openings and in exit enclosures in lieu of the minimum 1-hour fire protection rating required by Table 8.3.3.2.2.

8.3.3.2.4 Where a 20-minute fire-protection-rated door is required in existing buildings, an existing 1¾ in. (44 mm) solid-bonded wood-core door, an existing steel-clad (tin-clad) wood door, or an existing solid-core steel door shall be permitted, unless otherwise specified by Chapters 11 through 43.

8.3.3.2.5 Existing doors permitted by 8.3.3.2.4 shall have a positive latch and a closer.

8.3.3.2.6 Openings required to have a fire protection rating by Table 8.3.3.2.2 shall be protected by approved, listed, and labeled fire door assemblies and fire window assemblies and their accompanying hardware, including all frames, closing devices, anchorage, and sills in accordance with the requirements of NFPA 80 except as otherwise specified in this *Code*.

8.3.3.3* Fire Doors.

8.3.3.3.1* Required fire door assemblies shall be installed, inspected, tested, and maintained in accordance with NFPA 80.

8.3.3.3.2 All fire door assemblies shall be labeled.

8.3.3.3.3 Labels on fire door assemblies shall be maintained in a legible condition.

8.3.3.3.4 In existing installations, steel door frames without a label shall be permitted where approved by the authority having jurisdiction.

8.3.3.3.5 Unless otherwise specified, fire doors shall be self-closing or automatic-closing.

Table 8.3.3.2.2 Minimum Fire Ratings for Opening Protectives in Fire-Resistance-Rated Assemblies and Fire-Rated Glazing Markings

Component	Walls and Partitions (hr)	Fire Door Assemblies (hr)	Door Vision Panel Maximum Size (in.^{2})	Fire-Rated Glazing Marking Door Vision Panel	Minimum Side Light/ Transom Assembly Rating (hr)		Fire-Rated Glazing Marking Side Light/ Transom Panel		Minimum Fire Window Rating[a,b] (hr)		Fire Window Marking	
					Fire Protection	Fire Resistance	Fire Protection	Fire Resistance	Fire Protection	Fire Resistance	Fire Protection	Fire Resistance
Elevator hoistways	2	1½	155 in.^{2} [c]	D-H-90 or D-H-W-90	NP	2	NP	D-H-W-120	NP	2	NP	W-120
	1	1	155 in.^{2} [c]	D-H-60 or D-H-W-60	NP	1	NP	D-H-W-60	NP	1	NP	W-60
	½	⅓	85 in.^{2} [d]	D-20 or D-W-20	⅓	⅓	D-H-20	D-W-20	⅓	⅓	OH-20	W-30
Elevator lobby (per 7.2.13.4)	1	1	100 in.^{2} [a]	≤100 in.^{2}, D-H-T-60 or D-H-W-60 >100 in.^{2}, D-H-W-60	NP	1	NP	D-H-W-60	NP	1	NP	W-60
Vertical shafts (including stairways, exits, and refuse chutes)	2	1½	Maximum size tested	D-H-90 or D-H-W-90	NP	2	NP	D-H-W-120	NP	2	NP	W-120
	1	1	Maximum size tested	D-H-60 or D-H-W-60	NP	1	NP	D-H-W-60	NP	1	NP	W-60
Replacement panels in existing vertical shafts	½	⅓	Maximum size tested	D-20 or D-W-20	⅓	⅓	D-H-20	D-W-20	⅓	⅓	OH-20	W-30
Horizontal exits	2	1½	Maximum size tested	D-H-90 or D-H-W-90	NP	2	NP	D-H-W-120	NP	2	NP	W-120
Horizontal exits served by bridges between buildings	2	¾	Maximum size tested[e]	D-H-45 or D-H-W-45	¾[e]	¾[e]	D-H-45	D-H-W-45	¾	¾	OH-45	W-120
Exit access corridors[f]	1	⅓	Maximum size tested	D-20 or D-W-20	¾	¾	D-H-45	D-H-W-45	¾	¾	OH-45	W-60
	½	⅓	Maximum size tested	D-20 or D-W-20	⅓	⅓	D-H-20	D-H-W-20	⅓	⅓	OH-20	W-30
Other fire barriers	3	3	100 in.^{2} [a]	≤100 in.^{2}, D-H-180 or D-H-W-180 >100 in.^{2}, D-H-W-180	NP	3	NP	D-H-W-180	NP	3	NP	W-180
	2	1½	Maximum size tested	D-H-90 or D-H-W-90	NP	2	NP	D-H-W-120	NP	2	NP	W-120
	1	¾	Maximum size tested[e]	D-H-45 or D-H-W-45	¾[e]	¾[e]	D-H-45	D-H-W-45	¾	¾	OH-45	W-60
	½	⅓	Maximum size tested	D-20 or D-W-20	⅓	⅓	D-H-20	D-H-W-20	⅓	⅓	OH-20	W-30
Smoke barriers[f]	1	⅓	Maximum size tested	D-20 or D-W-20	¾	¾	D-H-45	D-H-W-45	¾	¾	OH-45	W-60
	½	⅓	Maximum size tested	D-20 or D-W-20	⅓	⅓	D-H-20	D-H-W-20	⅓	⅓	OH-20	W-30
Smoke partitions[f,g]	1	⅓	Maximum size tested	D-20 or D-W-20	¾	¾	D-H-45	D-H-W-45	¾	¾	OH-45	W-60
	½	⅓	Maximum size tested	D-20 or D-W-20	⅓	⅓	D-H-20	D-H-W-20	⅓	⅓	OH-20	W-30

For SI units, 1 in.^{2} = 0.00064516 m^2.

NP: Not permitted.

[a]Fire resistance glazing tested to ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, or UL 263, *Fire Tests of Building Construction and Materials*, shall be permitted in the maximum size tested *(see 8.3.3.6.8)*.

[b]Fire-rated glazing in exterior windows shall be marked in accordance with Table 8.3.3.6.3.

[c]See ASME A17.1/CSA B44, *Safety Code for Elevators and Escalators*, for additional information.

[d]See ASME A17.3, *Safety Code for Existing Elevators and Escalators*, for additional information.

[e]Maximum area of individual exposed lights shall be 1296 in.^{2} (0.84 m^2), with no dimension exceeding 54 in. (1.37 m) unless otherwise tested. [**80:**Table 4.4.5 Note b and **80:**4.4.5.1]

[f]Fire doors are not required to have a hose stream test per UL 10B, *Fire Tests of Door Assemblies*, or UL 10C, *Positive Pressure Fire Tests of Door Assemblies.*

[g]For residential board and care, see 32.2.3.1 and 33.2.3.1.

8.3.3.4 Floor Fire Door Assemblies.

8.3.3.4.1 Floor fire door assemblies used to protect openings in fire-resistance-rated floors shall be tested in accordance with NFPA 288 and shall achieve a fire resistance rating not less than the assembly being penetrated.

8.3.3.4.2 Floor fire door assemblies shall be listed and labeled.

8.3.3.5 Fire Windows.

8.3.3.5.1 Fire window assemblies shall be installed, inspected, tested, and maintained in accordance with NFPA 80.

8.3.3.5.2 All fire window assemblies shall be labeled.

8.3.3.5.3* Fire window assemblies shall be permitted in fire barriers having a required fire resistance rating of 1 hour or less and shall be of an approved type with the appropriate fire protection rating for the location in which they are installed.

8.3.3.6 Glazing.

8.3.3.6.1 Glazing materials that have been listed and labeled to indicate the type of opening to be protected for fire protection purposes shall be permitted to be used in approved opening protectives in accordance with Table 8.3.3.2.2 and NFPA 80.

8.3.3.6.2 Fire-rated glazing assemblies shall be permitted as follows:

(1) Those marked as complying with hose stream requirements (H) shall be permitted in applications that do not require compliance with hose stream requirements.
(2) Those marked as complying with temperature rise requirements (T) shall be permitted in applications that do not require compliance with temperature rise requirements.
(3) Those marked with ratings that exceed the ratings required by this *Code* shall be permitted.

8.3.3.6.3 New fire-protection glazing shall be marked in accordance with Table 8.3.3.6.3 and Table 8.3.3.2.2, and such marking shall be permanently affixed.

8.3.3.6.4 New fire resistance glazing shall be marked in accordance with Table 8.3.3.6.3 and Table 8.3.3.2.2, and such marking shall be permanently affixed.

8.3.3.6.5 Fire protection glazing shall be permitted in fire barriers having a required fire resistance rating of 1 hour or less and shall be of an approved type with the appropriate fire protection rating for the location in which the barriers are installed.

8.3.3.6.6* Glazing in fire window assemblies, other than in existing fire window installations of wired glass and other fire-rated glazing material, shall be of a design that has been tested to meet the conditions of acceptance of NFPA 257 or UL 9, *Fire Tests of Window Assemblies*.

8.3.3.6.7 Fire protection glazing in fire door assemblies, other than in existing fire-rated door assemblies, shall be of a design that has been tested to meet the conditions of acceptance of NFPA 252, UL 10B, *Fire Tests of Door Assemblies*, or UL 10C, *Positive Pressure Fire Tests of Door Assemblies*.

8.3.3.6.8 Fire resistance glazing tested in accordance with ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, or UL 263, *Fire Tests of Building Construction and Materials*, shall be permitted in fire doors and fire window assemblies in accordance with their listings.

8.3.3.6.9 Nonsymmetrical fire protection glazing systems shall be tested with each face exposed to the furnace, and the assigned fire protection rating shall be the shortest duration obtained from the two tests conducted in compliance with NFPA 257 or UL 9, *Fire Tests of Window Assemblies*.

8.3.3.6.10 The total combined area of fire protection glazing in fire window assemblies and fire door assemblies used in fire barriers shall not exceed 25 percent of the area of the fire barrier that is common with any room, unless the installation is an existing fire window of wired glass or other fire protection glazing in approved frames.

8.3.3.6.11 Existing installations of wired glass of ¼ in. (6.3 mm) thickness previously approved for fire protection purposes shall be permitted to remain in use.

8.3.3.7 Sidelights and Transoms. Glazing used in sidelights and transoms adjacent to 20-minute doors in 1-hour corridor fire barriers shall be tested in accordance with 8.3.3.2, including hose stream, and shall attain a minimum 45-minute fire protection rating.

8.3.4 Penetrations.

8.3.4.1 General.

8.3.4.1.1 The provisions of 8.3.4 shall govern the materials and methods of construction used to protect through-penetrations and membrane penetrations in fire walls, fire barrier walls, and fire-resistance-rated horizontal assemblies.

8.3.4.1.2 The provisions of 8.3.4 shall not apply to approved existing materials and methods of construction used to protect existing through-penetrations and existing membrane penetrations in fire walls, fire barrier walls, or fire-resistance-rated hori-

Table 8.3.3.6.3 Marking Fire-Rated Glazing Assemblies

Fire Test Standard	Marking	Definition of Marking
ASTM E119 or UL 263	W	Meets wall assembly criteria
NFPA 257 or UL 9	OH	Meets fire window assembly criteria, including the hose stream test
NFPA 252, UL 10B, or UL 10C	D	Meets fire door assembly criteria
	H	Meets fire door assembly hose stream test
	T	Meets 450°F (232°C) temperature rise criteria for 30 minutes
	XXX	The time, in minutes, of fire resistance or fire protection rating of the glazing assembly

zontal assemblies, unless otherwise required by Chapters 11 through 43.

8.3.4.1.3 Penetrations shall be protected by a tested system installed and maintained in accordance with the manufacturer's instructions.

8.3.4.2* Firestop Systems and Devices Required.

8.3.4.2.1 Penetrations for cables, cable trays, conduits, pipes, tubes, combustion vents and exhaust vents, wires, and similar items to accommodate electrical, mechanical, plumbing, and communications systems that pass through a wall, floor, or floor/ceiling assembly constructed as a fire barrier shall be protected by a firestop system or device.

8.3.4.2.2 Testing. The firestop system or device shall be tested in accordance with ASTM E814, *Standard Test Method for Fire Tests of Penetration Firestop Systems*, or UL 1479, *Fire Tests of Penetration Firestops*, at a minimum positive pressure differential of 0.01 in. water column (2.5 Pa) between the exposed and the unexposed surface of the test assembly.

8.3.4.2.3 F Ratings. Firestop systems and devices shall have an F rating of not less than 1 hour, and not less than the required fire resistance rating of the fire barrier penetrated.

8.3.4.2.4 T Ratings.

8.3.4.2.4.1 Penetrations in fire-resistance-rated horizontal assemblies shall have a T rating of not less than 1 hour, and not less than the fire resistance rating of the horizontal assembly.

8.3.4.2.4.2 A T rating shall not be required for either of the following:

(1) Floor penetrations contained within the cavity of a wall assembly
(2) Penetrations through floors or floor assemblies where the penetration is not in direct contact with combustible material

8.3.4.2.5 Alternative Firestop Requirements.

8.3.4.2.5.1 The requirements of 8.3.4.2 shall not apply where otherwise permitted by any one of the following:

(1) Where penetrations are tested and installed as part of an assembly tested and rated in accordance with ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, or UL 263, *Fire Tests of Building Construction and Materials*
(2) Where penetrations through floors are enclosed in a shaft enclosure designed as a fire barrier
(3) Where concrete, grout, or mortar has been used to fill the annular spaces around cast-iron, copper, or steel piping, conduit, or tubing that penetrates one or more concrete or masonry fire-resistance-rated assemblies, and all of the following applies:
    (a) The nominal diameter of each penetrating item does not exceed 6 in. (150 mm).
    (b) The opening size does not exceed 1 ft^2 (0.09 m^2).
    (c) The thickness of the concrete, grout, or mortar is the full thickness of the assembly.
(4) Where penetration is limited to one floor, the firestopping material is capable of preventing the passage of flame and hot gases sufficient to ignite cotton waste when subjected to the time-temperature fire conditions of ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, or UL 263, *Fire Tests of Building Materials*, under a minimum positive pressure differential of 0.01 in. water column (2.5 Pa) at the location of the penetration for the time period equivalent to the required fire resistance rating of the assembly penetrated, and the firestopping materials are used with the following penetrating items:
    (a) Steel, ferrous, or copper cables
    (b) Cable or wire with steel jackets
    (c) Cast-iron, steel, or copper pipes
    (d) Steel conduit or tubing

8.3.4.2.5.2 The maximum nominal diameter of the penetrating item, as indicated in 8.3.4.2.5.1(4)(a) through 8.3.4.2.5.1(4)(d), shall not be greater than 4 in. (100 mm) and shall not exceed an aggregate 100 $in.^2$ (64,520 mm^2) opening in any 100 ft^2 (9.3 m^2) of floor or wall area.

8.3.4.3 Sleeves. Where the penetrating item uses a sleeve to penetrate the wall or floor, the sleeve shall be securely set in the wall or floor, and the space between the item and the sleeve shall be filled with a material that complies with 8.3.4.2.

8.3.4.4 Insulation and Coverings. Insulation and coverings for penetrating items shall not pass through the wall or floor unless the insulation or covering has been tested as part of the firestop system or device.

8.3.4.5 Vibration Isolation Equipment or Systems. Where vibration isolation of equipment or systems is employed, the vibration restraint(s) shall be located outside of the partition, wall, or floor assembly for which the equipment or systems pass through.

8.3.4.6 Transitions.

8.3.4.6.1 Where piping penetrates a fire-resistance-rated wall or floor assembly, combustible piping shall not connect to noncombustible piping unless it can be demonstrated that the transition will not reduce the fire resistance rating, except in the case of previously approved installations.

8.3.4.6.2 Unshielded couplings shall not be used to connect noncombustible piping to combustible piping unless it can be demonstrated that the transition complies with the fire-resistive requirements of 8.3.4.2.

8.3.4.7 Membrane Penetrations.

8.3.4.7.1 Membrane penetrations for cables, cable trays, conduits, pipes, tubes, combustion vents, exhaust vents, wires, and similar items to accommodate electrical, mechanical, plumbing, and communications systems that pass through a membrane of a wall, floor, or floor/ceiling assembly constructed as a fire barrier shall be protected by a firestop system or device and shall comply with 8.3.4.2 through 8.3.4.6.2.

Δ **8.3.4.7.2** The firestop system or device shall be tested in accordance with ASTM E814, *Standard Test Method for Fire Tests of Penetration Firestop Systems*, or UL 1479, *Fire Tests of Penetration Firestops*, at a minimum positive pressure differential of 0.01 in. water column (2.5 Pa) between the exposed and the unexposed surface of the test assembly, unless one of the following conditions applies:

(1) Membrane penetrations of ceilings that are not an integral part of a fire-resistance-rated floor/ceiling or roof/ceiling assembly

(2) Membrane penetrations of steel, ferrous, or copper conduit, piping, or tubing, and steel electrical outlet boxes and wires, or combustion vents or exhaust vents where the annular space is protected with an approved material and the aggregate area of the openings does not exceed 100 in.^{2} (64,520 mm^2) in any 100 ft^2 (9.3 m^2) of ceiling area
(3) Electrical outlet boxes and fittings provided that such devices are listed for use in fire-resistance-rated assemblies and are installed in accordance with their listing
(4) The annular space created by the membrane penetration of a fire sprinkler shall be permitted, provided that the space is covered by a metal escutcheon plate

8.3.4.7.3 Where walls or partitions are required to have a minimum 1-hour fire resistance rating, recessed fixtures shall be installed in the wall or partition in such a manner that the required fire resistance is not reduced, unless one of the following criteria is met:

(1) Any steel electrical box not exceeding 16 in.^{2} (10,300 mm^2) in area shall be permitted where the aggregate area of the openings provided for the boxes does not exceed 100 in.^{2} (64,520 mm^2) in any 100 ft^2 (9.3 m^2) of wall area, and, where outlet boxes are installed on opposite sides of the wall, the boxes shall be separated by one of the following means:
    (a) Horizontal distance of not less than 24 in. (610 mm)
    (b) Horizontal distance of not less than the depth of the wall cavity, where the wall cavity is filled with cellulose loose-fill, rock wool, or slag wool insulation
    (c)* Solid fireblocking
    (d) Other listed materials and methods
(2) Membrane penetrations for any listed electrical outlet box made of any material shall be permitted, provided that such boxes have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing.
(3) The annular space created by the membrane penetration of a fire sprinkler shall be permitted, provided that the space is covered by a metal escutcheon plate.
(4) Membrane penetrations by electrical boxes of any size or type, which have been listed as part of a wall opening protective material system for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing, shall be permitted.

8.3.4.8 Ducts and Air-Transfer Openings. Openings for air-handling ductwork or air movement shall be protected in accordance with 9.2.1.

8.3.5 Joints.

8.3.5.1 General.

8.3.5.1.1 The provisions of 8.3.5 shall govern the materials and methods of construction used to protect joints in fire barriers, in between fire barriers, and at the perimeter of fire barriers where fire barriers meet other fire barriers, the floor or roof deck above, or the outside walls.

8.3.5.1.2 The provisions of 8.3.5 shall not apply to approved existing materials and methods of construction used to protect existing joints in fire barriers, unless otherwise required by Chapters 11 through 43.

8.3.5.2 Joint System Requirements.

8.3.5.2.1* Joints made within or at the perimeter of fire barriers, between fire-resistance-rated assemblies, or where fire barriers meet other fire barriers, the floor or roof deck above, or the outside walls shall be protected with a joint system that is designed and tested to prevent the spread of fire for a time period equal to that of the assembly in which the joint is located.

8.3.5.2.2 Joints made within or at the perimeter of fire barriers used as smoke barriers shall be capable of restricting the transfer of smoke in accordance with 8.5.7.4.

8.3.5.2.3 Joints shall be installed in accordance with a tested system, and installed and maintained in accordance with the manufacturer's instructions.

8.3.5.2.4 Testing of the joint system in a fire barrier shall be representative of the actual installation suitable for the required engineering demand without compromising the fire resistance rating of the assembly or the structural integrity of the assembly.

8.3.5.2.5 Such materials, systems, or devices shall be tested as part of the assembly in accordance with the requirements of ASTM E1966, *Standard Test Method for Fire-Resistive Joint Systems*, or UL 2079, *Tests for Fire Resistance of Building Joint Systems*.

8.3.5.2.6 All joint systems shall be tested at their maximum joint width in accordance with the requirements of ASTM E1966, *Standard Test Method for Fire-Resistive Joint Systems*, or UL 2079, *Tests for Fire Resistance of Building Joint Systems*, under a minimum positive pressure differential of 0.01 in. water column (2.5 N/m^2) for a time period equal to that of the assembly.

8.3.5.2.7 All test specimens shall comply with the minimum height or length required by the standard.

8.3.5.2.8 Wall assemblies shall be subjected to a hose stream test in accordance with ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, or UL 263, *Fire Tests of Building Construction and Materials*.

8.3.5.3 Joints made between a fire barrier and a non-fire-resistance-rated floor or roof sheathing, slab, or deck above shall be protected by an approved continuity head of wall joint system installed and tested in accordance with ASTM E2837, *Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies*, and the system shall have an F rating and T rating of not less than the required fire resistance rating of the fire barrier.

8.3.5.4* Exterior Curtain Walls and Perimeter Joints.

8.3.5.4.1 Voids created between the fire-resistance-rated floor assembly and the exterior curtain wall shall be protected with a perimeter joint system that is designed and tested in accordance with ASTM E2307, *Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Apparatus*.

8.3.5.4.2 The perimeter joint system shall have an F rating equal to the fire resistance rating of the floor assembly.

8.4 Smoke Partitions.

8.4.1* General. Where required elsewhere in this *Code*, smoke partitions shall be provided to limit the transfer of smoke.

8.4.2 Continuity. Smoke partitions shall comply with the following:

(1) They shall extend from the floor to the underside of the floor or roof deck above, through any concealed spaces, such as those above suspended ceilings, and through interstitial structural and mechanical spaces.

(2)* They shall be permitted to extend from the floor to the underside of a monolithic or suspended ceiling system where all of the following conditions are met:

(a) The ceiling system forms a continuous membrane.
(b) A smoke-tight joint is provided between the top of the smoke partition and the bottom of the suspended ceiling.
(c) The space above the ceiling is not used as a plenum.

(3) Smoke partitions enclosing hazardous areas shall be permitted to terminate at the underside of a monolithic or suspended ceiling system where all of the following conditions are met:

(a) The ceiling system forms a continuous membrane.
(b) A smoke-tight joint is provided between the top of the smoke partition and the bottom of the suspended ceiling.
(c) Where the space above the ceiling is used as a plenum, return grilles from the hazardous area into the plenums are not permitted.

8.4.3 Opening Protectives.

8.4.3.1 Doors in smoke partitions shall comply with 8.4.3.2 through 8.4.3.6.

8.4.3.2 Doors shall comply with the provisions of 7.2.1.

8.4.3.3 Doors shall not include louvers.

8.4.3.4* Door clearances shall be in accordance with NFPA 80.

8.4.3.5 Doors shall be self-closing or automatic-closing in accordance with 7.2.1.8.

8.4.3.6 Shutters that protect openings shall be automatic-closing upon operation of approved smoke detectors installed in accordance with the provisions of *NFPA 72*.

8.4.4 Penetrations. The provisions of 8.4.4 shall govern the materials and methods of construction used to protect through-penetrations and membrane penetrations of smoke partitions.

8.4.4.1 Penetrations for cables, cable trays, conduits, pipes, tubes, vents, wires, and similar items to accommodate electrical, mechanical, plumbing, and communications systems that pass through a smoke partition shall be protected by a system or material that is capable of limiting the transfer of smoke.

8.4.4.2 Where vibration isolation of equipment or systems is employed, the vibration restraint(s) shall be located outside of the partition, wall, or floor assembly through which the equipment or systems pass.

8.4.5 Joints.

8.4.5.1 The provisions of 8.4.5 shall govern the materials and methods of construction used to protect joints in between and at the perimeter of smoke partitions or, where smoke partitions meet other smoke partitions, the floor or roof deck above, or the outside walls. The provisions of 8.4.5 shall not apply to approved existing materials and methods of construction used to protect existing joints in smoke partitions, unless otherwise required by Chapters 11 through 43.

8.4.5.2 Joints made within or at the perimeter of smoke partitions shall be protected with a joint system that is capable of limiting the transfer of smoke.

8.4.6 Air-Transfer Openings.

8.4.6.1 General. The provisions of 8.4.6 shall govern the materials and methods of construction used to protect air-transfer openings in smoke partitions.

8.4.6.2* Smoke Dampers. Air-transfer openings in smoke partitions shall be provided with approved smoke dampers designed and tested in accordance with the requirements of UL 555S, *Smoke Dampers*, to limit the transfer of smoke.

8.4.6.3 Smoke Damper Ratings. Smoke damper leakage ratings shall be not less than Class II. Elevated temperature ratings shall be not less than 250°F (140°C).

8.4.6.4 Smoke Detectors. Smoke dampers in air-transfer openings shall close upon detection of smoke by approved smoke detectors installed in accordance with *NFPA 72*.

8.5 Smoke Barriers.

8.5.1* General. Where required by Chapters 11 through 43, smoke barriers shall be provided to subdivide building spaces for restricting the movement of smoke.

8.5.2* Continuity.

8.5.2.1 Smoke barriers required by this *Code* shall be continuous from an outside wall to an outside wall, from a floor to a floor, or from a smoke barrier to a smoke barrier, or by use of a combination thereof.

8.5.2.2 Smoke barriers required by this *Code* shall be continuous through all concealed spaces, such as those found above a ceiling, including interstitial spaces.

8.5.2.3 A smoke barrier required for an occupied space below an interstitial space shall not be required to extend through the interstitial space, provided that the construction assembly forming the bottom of the interstitial space provides resistance to the passage of smoke equal to that provided by the smoke barrier.

8.5.3 Fire Barrier Used as Smoke Barrier. A fire barrier shall be permitted to be used as a smoke barrier, provided that it meets the requirements of Section 8.5.

8.5.4 Opening Protectives.

8.5.4.1* Doors in smoke barriers shall close the opening, leaving only the minimum clearance necessary for proper operation, and shall be without louvers or grilles. For other than previously approved existing doors, the clearance under the bottom of the doors shall be a maximum of ¾ in. (19 mm).

8.5.4.2 Where required by Chapters 11 through 43, doors in smoke barriers that are required to be smoke-leakage-rated shall comply with the requirements of 8.2.2.4.

8.5.4.3 Latching hardware shall be required on doors in smoke barriers, unless specifically exempted by Chapters 11 through 43.

8.5.4.4* Doors in smoke barriers shall be self-closing or automatic-closing in accordance with 7.2.1.8 and shall comply with the provisions of 7.2.1.

8.5.4.5 Fire window assemblies shall comply with 8.3.3.

8.5.5 Ducts and Air-Transfer Openings.

8.5.5.1 General. The provisions of 8.5.5 shall govern the materials and methods of construction used to protect ducts and air-transfer openings in smoke barriers.

8.5.5.2 Smoke Dampers.

8.5.5.2.1 Where a smoke barrier is penetrated by a duct or air-transfer opening, a smoke damper designed and tested in accordance with the requirements of UL 555S, *Smoke Dampers*, shall be installed.

8.5.5.2.2 Where a smoke barrier is also constructed as a fire barrier, a combination fire–smoke damper designed and tested in accordance with the requirements of UL 555, *Fire Dampers*, and UL 555S, *Smoke Dampers*, shall be installed.

Δ **8.5.5.3 Smoke Damper Exemptions.** Smoke dampers shall not be required under any of the following conditions:

(1) Where specifically exempted by provisions in Chapters 11 through 43
(2) Where ducts or air-transfer openings are part of an engineered smoke control system and the smoke damper will interfere with the operation of a smoke control system
(3) Where the air in ducts continues to move and the air handling system installed is arranged to prevent recirculation of exhaust or return air under fire emergency conditions
(4) Where the air inlet or outlet openings in ducts are limited to a single smoke compartment
(5) Where ducts penetrate floors that serve as smoke barriers
(6) Where ducts penetrate smoke barriers forming a communicating space separation in accordance with 8.6.6(4)(a)

8.5.5.4 Installation, Testing, and Maintenance.

8.5.5.4.1 Air-conditioning, heating, ventilating ductwork, and related equipment, including smoke dampers and combination fire and smoke dampers, shall be installed in accordance with NFPA 90A, NFPA 90B, NFPA 105, or NFPA 80, as applicable.

8.5.5.4.2 Smoke dampers and combination fire and smoke dampers required by this *Code* shall be inspected, tested, and maintained in accordance with NFPA 105.

8.5.5.4.3 The equipment specified in 8.5.5.4.1 shall be installed in accordance with the requirements of 8.5.5, the manufacturer's installation instructions, and the equipment listing.

8.5.5.5 Access and Identification.

8.5.5.5.1 Access to the dampers shall be provided for inspection, testing, and maintenance.

8.5.5.5.2 Smoke and combination fire and smoke dampers in new construction shall be provided with an approved means of access, as follows:

(1) The means of access shall be large enough to allow inspection and maintenance of the damper and its operating parts.
(2) The access shall not affect the integrity of fire-resistance-rated assemblies or smoke barrier continuity.
(3) The access openings shall not reduce the fire resistance rating of the assembly.
(4) Access doors in ducts shall be tight-fitting and suitable for the required duct construction.
(5) Access and maintenance shall comply with the requirements of the mechanical code.

8.5.5.5.3 Identification. Access points to fire and smoke dampers in new construction shall be permanently identified by one of the following:

(1) A label having letters not less than ½ in. (13 mm) in height and reading as one of the following:
   (a) FIRE/SMOKE DAMPER
   (b) SMOKE DAMPER
   (c) FIRE DAMPER
(2) Symbols as approved by the authority having jurisdiction

8.5.5.6 Smoke Damper Ratings. Smoke damper leakage ratings shall be not less than Class II. Elevated temperature ratings shall be not less than 250°F (140°C).

8.5.5.7 Smoke Detectors.

8.5.5.7.1 Required smoke dampers in ducts penetrating smoke barriers shall close upon detection of smoke by approved smoke detectors in accordance with *NFPA 72* unless one of the following conditions exists:

(1) The ducts penetrate smoke barriers above the smoke barrier doors, and the door release detector actuates the damper.
(2) Approved smoke detector installations are located within the ducts in existing installations.

8.5.5.7.2 Where a duct is provided on one side of the smoke barrier, the smoke detectors on the duct side shall be in accordance with 8.5.5.7.1.

8.5.5.7.3 Required smoke dampers in air-transfer openings shall close upon detection of smoke by approved smoke detectors in accordance with *NFPA 72*.

8.5.6 Penetrations.

8.5.6.1 The provisions of 8.5.6 shall govern the materials and methods of construction used to protect through-penetrations and membrane penetrations of smoke barriers.

8.5.6.2 Penetrations for cables, cable trays, conduits, pipes, tubes, vents, wires, and similar items to accommodate electrical, mechanical, plumbing, and communications systems that pass through a wall, floor, or floor/ceiling assembly constructed as a smoke barrier, or through the ceiling membrane of the roof/ceiling of a smoke barrier assembly, shall be protected by a system or material capable of restricting the transfer of smoke.

8.5.6.3 Where a smoke barrier is also constructed as a fire barrier, the penetrations shall be protected in accordance with the requirements of 8.3.4 to limit the spread of fire for a time period equal to the fire resistance rating of the assembly and the requirements of 8.5.6 to restrict the transfer of smoke, unless the requirements of 8.5.6.4 are met.

8.5.6.4 Where sprinklers penetrate a single membrane of a fire-resistance-rated assembly in buildings equipped throughout with an approved automatic fire sprinkler system, noncombustible escutcheon plates shall be permitted, provided that the space around each sprinkler penetration does not exceed ½ in. (13 mm), measured between the edge of the membrane and the sprinkler.

8.5.6.5 In new construction, through-penetrations shall be protected by an approved through-penetration firestop system installed and tested in accordance with the requirements of UL 1479, *Fire Tests of Penetration Firestops*, for air leakage and shall comply with one of the following:

(1) A maximum 5 ft^3/min per ft^2 (0.025 m^3/s per m^2) of penetration opening for each through-penetration firestop system
(2) A maximum total cumulative leakage of 50 ft^3/min (0.024 m^3/s) for any 100 ft^2 (9.3 m^2) of wall area or floor area

8.5.6.6 Where the penetrating item uses a sleeve to penetrate the smoke barrier, the sleeve shall be securely set in the smoke barrier, and the space between the item and the sleeve shall be filled with a listed system or a material capable of restricting the transfer of smoke.

8.5.6.7 Where vibration isolation of equipment or systems is employed, the vibration restraint(s) shall be located outside of the partition, wall, or floor assembly through which the equipment or systems pass.

8.5.7 Joints.

8.5.7.1 The provisions of 8.5.7 shall govern the materials and methods of construction used to protect joints in between and at the perimeter of smoke barriers or, where smoke barriers meet other smoke barriers, the floor or roof deck above, or the outside walls. The provisions of 8.5.7 shall not apply to approved existing materials and methods of construction used to protect existing joints in smoke barriers, unless otherwise required by Chapters 11 through 43.

8.5.7.2 Joints made within, between, or at the perimeter of smoke barriers shall be protected with a joint system that is tested in accordance with the requirements of UL 2079, *Tests for Fire Resistance of Building Joint Systems*, for air leakage, and the L rating of the joint system shall not exceed 5 ft^3/min per ft (0.00775 m^3/s per m) of the joint.

8.5.7.3 Smoke barriers that are also constructed as fire barriers shall be protected with a joint system that is designed and tested to resist the spread of fire for a time period equal to the required fire resistance rating of the assembly and restrict the transfer of smoke in accordance with 8.5.7.2.

8.5.7.4 Testing of the joint system in a smoke barrier that also serves as fire barrier shall be representative of the actual installation.

8.6 Vertical Openings.

8.6.1 Floor Smoke Barriers. Every floor that separates stories in a building shall meet the following criteria:

(1) It shall be constructed as a smoke barrier in accordance with Section 8.5.
(2) It shall be permitted to have openings as described by 8.6.6 through 8.6.9, or Chapters 11 through 43.

8.6.2* Continuity. Openings through floors shall be enclosed with fire barrier walls, shall be continuous from floor to floor, or floor to roof, and shall be protected as appropriate for the fire resistance rating of the barrier.

8.6.3 Continuity Exemptions. The requirements of 8.6.2 shall not apply where otherwise permitted by any of the following:

(1) Where penetrations for cables, cable trays, conduits, pipes, tubes, combustion vents and exhaust vents, wires, pneumatic tube conveyors, and similar items to accommodate electrical, mechanical, plumbing, and communications systems are protected in accordance with 8.3.4.2 and 8.5.6
(2) Where specified by 8.6.6, 8.6.7, 8.6.8, 8.6.9.1, 8.6.9.2, 8.6.9.3, or Chapters 11 through 43
(3) Where escalators and moving walks are protected in accordance with 8.6.9.6 or 8.6.9.7
(4) Where expansion or seismic joints are designed to prevent the penetration of fire and are shown to have a fire resistance rating of not less than that required for the floor when tested in accordance with UL 2079, *Tests for Fire Resistance of Building Joint Systems*
(5) Where existing mail chutes meet one of the following criteria:
    (a) The cross-sectional area does not exceed 0.1 ft^2 (0.01 m^2).
    (b) The building is protected throughout by an approved automatic sprinkler system in accordance with Section 9.7.

8.6.4 Shafts. Shafts that do not extend from the bottom to the top of the building or structure shall comply with 8.6.4.1, 8.6.4.2, or 8.6.4.3, as modified by 8.6.4.4 or 8.6.4.5.

8.6.4.1 Shafts that do not extend to the top of the building or structure shall be enclosed at the highest level of the shaft with construction in accordance with 8.6.5.

8.6.4.2 Shafts that do not extend to the bottom of the building or structure shall be enclosed at the lowest level of the shaft with construction in accordance with 8.6.5.

8.6.4.3 Shafts that do not extend to the bottom and to the top of the building or structure shall be enclosed at the lowest and highest level of the shaft with construction in accordance with 8.6.5.

8.6.4.4 In lieu of any enclosure required at the lowest or highest level of a shaft by 8.6.4.1 through 8.6.4.3, shafts shall be permitted to terminate in a room or space having a use related to the purpose of the shaft, provided that the room or space is separated from the remainder of the building by construction having a fire resistance rating and opening protectives in accordance with 8.6.5 and 8.3.5.

8.6.4.5 Any enclosure required at the lowest or highest level of a shaft by 8.6.4.1 through 8.6.4.3 shall be permitted to be protected by approved fire dampers installed in accordance with their listing.

8.6.5* Required Fire Resistance Rating. The minimum fire resistance rating for the enclosure of floor openings shall be not less than as follows:

(1) Enclosures connecting four or more stories in new construction shall be 2-hour fire barriers.
(2) Other enclosures in new construction shall be 1-hour fire barriers.

(3) Existing enclosures in existing buildings shall be ½-hour fire barriers.
(4) Enclosures for lodging and rooming houses shall be as specified in Chapter 26.
(5) Enclosures for new hotels shall be as specified in Chapter 28.
(6) Enclosures for new apartment buildings shall be as specified in Chapter 30.
(7) Enclosures for exits shall be in accordance with 7.1.3.2.1.

8.6.6 Communicating Space. Unless prohibited by Chapters 11 through 43, unenclosed floor openings forming a communicating space between floor levels shall be permitted, provided that the following conditions are met:

(1) The communicating space does not connect more than three contiguous stories.
(2) The lowest or next-to-lowest story within the communicating space is a street floor.
(3) The entire floor area of the communicating space shall comply with one of the following:
    (a) The area is open and unobstructed, such that a fire in any part of the communicating space will be readily obvious to the occupants of the space prior to the time it becomes an occupant hazard.
    (b) The area is open and provided with automatic smoke detection in accordance with Section 9.6.
(4) The communicating space is separated from the remainder of the building by fire barriers with not less than a 1-hour fire resistance rating, unless one of the following is met:
    (a) In buildings protected throughout by an approved automatic sprinkler system in accordance with Section 9.7, a smoke barrier in accordance with Section 8.5 shall be permitted to serve as the separation required by 8.6.6(4).
    (b) The requirement of 8.6.6(4) shall not apply to fully sprinklered residential housing units of detention and correctional occupancies in accordance with 22.3.1(2) and 23.3.1.1(2).
(5) The communicating space has ordinary-hazard contents protected throughout by an approved automatic sprinkler system in accordance with Section 9.7 or has only low-hazard contents. *(See 6.2.2.)*
(6) Egress capacity is sufficient to allow all the occupants of all levels within the communicating space to simultaneously egress the communicating space by considering it as a single-floor area in determining the required egress capacity.
(7)* Each occupant within the communicating space has access to not less than one exit without having to traverse another story within the communicating space.
(8) Each occupant not in the communicating space has access to not less than one exit without having to enter the communicating space.

8.6.7* Atriums. Unless prohibited by Chapters 11 through 43, an atrium shall be permitted, provided that all of the following conditions are met:

(1) The atrium is separated from the adjacent spaces by fire barriers with not less than a 1-hour fire resistance rating, with opening protectives for corridor walls, unless one of the following is met:
    (a) The requirement of 8.6.7(1) shall not apply to existing, previously approved atriums.
    (b) Any number of levels of the building shall be permitted to open directly to the atrium without enclosure, based on the results of the engineering analysis required in 8.6.7(5).
    (c)* Glass walls and inoperable windows shall be permitted in lieu of the fire barriers where all the following are met:
        i. Automatic sprinklers are spaced along both sides of the glass wall and the inoperable windows at intervals not to exceed 6 ft (1830 mm).
        ii. The automatic sprinklers specified in 8.6.7(1)(c)i. are located at a distance from the glass wall not to exceed 12 in. (305 mm) and arranged so that the entire surface of the glass is wet upon operation of the sprinklers.
        iii.* The glass wall is of tempered, wired, laminated, or ceramic glass held in place by a retention system that allows the glass framing system to deflect without breaking (loading) the glass before the sprinklers operate.
        iv. The automatic sprinklers required by 8.6.7(1)(c)i. are not required on the atrium side of the glass wall and the inoperable window where there is no walkway or other floor area on the atrium side above the main floor level.
        v. Doors in the glass walls are of glass or other material that resists the passage of smoke.
        vi. Doors in the glass walls are self-closing or automatic-closing upon detection of smoke.
        vii. The glass is continuous vertically, without horizontal mullions, window treatments, or other obstructions that would interfere with the wetting of the entire glass surface.
(2) Access to exits is permitted to be within the atrium, and exit discharge in accordance with 7.7.2 is permitted to be within the atrium.
(3) The occupancy within the atrium meets the specifications for classification as low- or ordinary-hazard contents. *(See 6.2.2.)*
(4) The entire building is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.
(5)* For other than existing, previously approved atriums, an engineering analysis is performed that demonstrates that the building is designed to keep the smoke layer interface above the highest unprotected opening to adjoining spaces, or 6 ft (1830 mm) above the highest floor level of exit access open to the atrium, for a period equal to 1.5 times the calculated egress time or 20 minutes, whichever is greater.
(6)* For other than existing, previously approved smoke control systems, where an engineered smoke control system is installed to meet the requirements of 8.6.7(5), the system is independently activated by each of the following:
    (a) Upon initiation of a smoke detection system or actuation of the required automatic sprinkler system within the atrium or areas open to the atrium

(b) Manual controls that are readily accessible to the fire department

8.6.8 Two-Story Openings with Partial Enclosure. A vertical opening serving as other than an exit enclosure, connecting only two adjacent stories and piercing only one floor, shall be permitted to be open to one of the two stories.

8.6.9 Convenience Openings.

8.6.9.1 Where permitted by Chapters 11 through 43, unenclosed vertical openings not concealed within the building construction shall be permitted as follows:

(1) Such openings shall connect not more than two adjacent stories (one floor pierced only).
(2) Such openings shall be separated from unprotected vertical openings serving other floors by a barrier complying with 8.6.5.
(3)* Such openings shall be separated from corridors.
(4)* In other than approved, existing convenience openings, such openings shall be separated from other fire or smoke compartments on the same floor.
(5) In new construction, the convenience opening shall be separated from the corridor referenced in 8.6.9.1(3) by a smoke partition, unless Chapters 11 through 43 require the corridor to have a fire resistance rating.
(6)* Such openings shall not serve as a required means of egress.

8.6.9.2 Where permitted by Chapters 11 through 43, unenclosed vertical openings created by convenience stairways shall comply with all of the following:

(1) The convenience stair openings shall not serve as required means of egress.
(2) The building shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.
(3)* The convenience stair openings shall be protected in accordance with the method detailed for the protection of vertical openings in NFPA 13.
(4) In new construction, the area of the floor opening shall not exceed twice the horizontal projected area of the stairway.
(5) For new construction, such openings shall not connect more than four contiguous stories, unless otherwise permitted by Chapters 11 through 43.

8.6.9.3 Convenience stairs shall be permitted to be unenclosed in large open areas such as atriums and shopping malls.

8.6.9.4 For other than existing hoistways in existing buildings, elevator cars located within a building shall be enclosed as follows:

(1) Where there are three or fewer elevator cars in the building, they shall be permitted to be located within the same hoistway enclosure.
(2) Where there are four elevator cars in the building, they shall be divided in such a manner that not less than two separate hoistway enclosures are provided.
(3) Where there are more than four elevator cars in the building, the number of elevator cars located within a single hoistway enclosure shall not exceed four.

8.6.9.5 Service openings for conveyors, elevators, and dumbwaiters, where required to be open on more than one story at the same time for purposes of operation, shall be provided with closing devices in accordance with 7.2.1.8.

8.6.9.6 Any escalators and moving walks serving as a required exit in existing buildings shall be enclosed in the same manner as exit stairways. *(See 7.1.3.2.)*

Δ **8.6.9.7** Any escalators and moving walks not constituting an exit shall have their floor openings enclosed or protected as required for other vertical openings, unless otherwise permitted by one of the following:

(1) The requirement of 8.6.9.7 shall not apply to escalators in large open areas, such as atriums and enclosed shopping malls.
(2)* In existing buildings protected throughout by an approved automatic sprinkler system in accordance with Section 9.7, escalator and moving walk openings shall be permitted to be protected in accordance with the method detailed in NFPA 13 or in accordance with a method approved by the authority having jurisdiction.
(3) In new buildings protected throughout by an approved automatic sprinkler system in accordance with Section 9.7, escalator and moving walk openings shall be permitted to be protected in accordance with the method detailed in NFPA 13 or in accordance with a method approved by the authority having jurisdiction, and the opening shall not connect more than four contiguous stories unless otherwise permitted by Chapters 11 through 43.
(4) In buildings protected throughout by an approved automatic sprinkler system in accordance with Section 9.7, escalator and moving walk openings shall be permitted to be protected by rolling steel shutters appropriate for the fire resistance rating of the vertical opening and complying with all of the following:
    (a) The shutters shall close automatically and independently of each other upon smoke detection and sprinkler operation.
    (b) A manual means of operating and testing the operation of the shutters shall be provided.
    (c) The shutters shall be operated not less than once a week to ensure that they remain in proper operating condition.
    (d) The shutters shall operate at a speed not to exceed 30 ft/min (0.15 m/s) and shall be equipped with a sensitive leading edge.
    (e) The leading edge shall arrest the progress of a moving shutter and cause it to retract a distance of approximately 6 in. (150 mm) upon the application of a force not exceeding 20 lbf (90 N) applied to the surface of the leading edge.
    (f) The shutter, following the retraction specified in 8.6.9.7(4)(e), shall continue to close.
    (g) The operating mechanism for the rolling shutter shall be provided with standby power complying with the provisions of *NFPA 70*.

8.6.10 Mezzanines.

8.6.10.1 General. Multilevel residential housing areas in detention and correctional occupancies in accordance with Chapters 22 and 23 shall be exempt from the provisions of 8.6.10.2 and 8.6.10.3.

8.6.10.2 Area Limitations.

8.6.10.2.1 The aggregate area of mezzanines located within a room, other than normally unoccupied equipment platforms, shall not exceed one-third the open area of the room in which the mezzanines are located. Enclosed space shall not be included in a determination of the size of the room in which the mezzanine is located.

8.6.10.2.2 The aggregate area of mezzanines located within a room, other than normally unoccupied equipment platforms, shall not exceed one-half the open area of the room in which the mezzanines are located, where all of following conditions are met:

(1) The building is protected throughout with a supervised automatic sprinkler system in accordance with 9.7.1.
(2) All portions of the mezzanines are open to the room in which the mezzanine is located, other than walls not more than 42 in. (1065 mm) high, columns, and posts.

8.6.10.2.3 No limit on the number of mezzanines in a room shall be required.

8.6.10.2.4 For purposes of determining the allowable mezzanine area, the aggregate area of the mezzanines shall not be included in the area of the room.

8.6.10.3 Openness. The openness of mezzanines shall be in accordance with 8.6.10.3.1 or 8.6.10.3.2.

8.6.10.3.1 All portions of a mezzanine, other than walls not more than 42 in. (1065 mm) high, columns, and posts, shall be open to and unobstructed from the room in which the mezzanine is located, unless the occupant load of the aggregate area of the enclosed space does not exceed 10.

8.6.10.3.2 A mezzanine having two or more means of egress shall not be required to open into the room in which it is located if not less than one of the means of egress provides direct access from the enclosed area to an exit at the mezzanine level.

8.6.11 Concealed Spaces and Draftstops.

8.6.11.1 Any concealed combustible space in which exposed building materials having a flame spread index greater than 25, when tested in accordance with 10.2.3, shall be draftstopped as follows:

(1) Every exterior and interior wall and partition shall be firestopped at each floor level, at the top-story ceiling level, and at the level of support for roofs.
(2) Every unoccupied attic space shall be subdivided by draftstops into areas not to exceed 3000 ft^2 (280 m^2).
(3) Any concealed space between the ceiling and the floor or roof above shall be draftstopped for the full depth of the space along the line of support for the floor or roof structural members and, if necessary, at other locations to form areas not to exceed 1000 ft^2 (93 m^2) for any space between the ceiling and floor, and 3000 ft^2 (280 m^2) for any space between the ceiling and roof.

8.6.11.2 The requirements of 8.6.11.1 shall not apply where any of the following conditions are met:

(1) Where the space is protected throughout by an approved automatic sprinkler system in accordance with Section 9.7
(2)* Where concealed spaces serve as plenums
(3) Where the installation is an existing installation

8.6.11.3* Draftstopping materials shall be not less than ½ in. (13 mm) thick gypsum panels, 15⁄32 in. (12 mm) thick wood structural panels, or other approved materials that are adequately supported.

8.6.11.4 The integrity of all draftstops shall be maintained.

8.6.11.5 In existing buildings, firestopping and draftstopping shall be provided as required by Chapters 11 through 43.

8.7 Special Hazard Protection.

8.7.1 General.

8.7.1.1* Protection from any area having a degree of hazard greater than that normal to the general occupancy of the building or structure shall be provided by one of the following means:

(1) Separating the area from other parts of the building with a fire barrier having a fire resistance rating of not less than 1 hour in accordance with Section 8.3 and without windows
(2) Protecting the area with automatic extinguishing systems in accordance with Section 9.7
(3) Applying both 8.7.1.1(1) and 8.7.1.1(2) where the hazard is severe or where otherwise specified by Chapters 11 through 43

8.7.1.2 In new construction, where protection is provided with automatic extinguishing systems without fire-resistive separation, the space protected shall be enclosed with smoke partitions in accordance with Section 8.4, unless otherwise permitted by one of the following conditions:

(1) Where mercantile occupancy general storage areas and stockrooms are protected by automatic sprinklers in accordance with Section 9.7
(2) Where hazardous areas in industrial occupancies are protected by automatic extinguishing systems in accordance with 40.3.2
(3) Where hazardous areas in detention and correctional occupancies are protected by automatic sprinklers in accordance with 22.3.2

8.7.1.3 Doors in barriers required to have a fire resistance rating shall have a minimum ¾-hour fire protection rating and shall be self-closing or automatic-closing in accordance with 7.2.1.8.

8.7.1.4 Unless prohibited by Chapters 11 through 43, existing doors with nonrated, factory- or field-applied protective plates extending not more than 48 in. (1220 mm) above the bottom of the door shall be permitted where they are installed in accordance with the door manufacturer's published listing.

8.7.2* Explosion Protection. Where hazardous processes or storage is of such a character as to introduce an explosion potential, an explosion venting system or an explosion suppression system specifically designed for the hazard involved shall be provided.

8.7.3 Hazardous Materials.

8.7.3.1 Where required by the provisions of Chapters 11 through 43, occupancies with storage, use, and handling of hazardous materials shall comply with the following codes unless otherwise modified by other provisions of this *Code*: NFPA 30, NFPA 54, NFPA 55, NFPA 58, NFPA 400, and NFPA 495.

8.7.3.2* No storage, use, or handling of hazardous materials shall be permitted in any location where such storage, use, or handling would jeopardize egress from the structure, unless otherwise permitted by a document listed in 8.7.3.1.

Δ **8.7.3.3* Alcohol-Based Hand-Rub (ABHR) Dispensers.** Where permitted by Chapters 11 through 43, ABHR dispensers shall be permitted provided they meet all of the criteria in 8.7.3.3.1 through 8.7.3.3.5.

N **8.7.3.3.1 Personal Use Containers.** The requirements of 8.7.3.3 shall not apply to individual personal use ABHR containers with a volume not exceeding 16.9 oz (500 mL).

N **8.7.3.3.2 ABHR Dispenser Capacity.** The capacity of ABHR dispensers shall comply with all of the following:

(1) The maximum individual dispenser fluid capacity shall be as follows:
   (a) 0.53 gal (2.0 L) for dispensers in corridors and areas open to corridors
   (b) 1.06 gal (4.0 L) for dispensers in corridors and areas open to corridors in buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7
   (c) 1.06 gal (4.0 L) for dispensers in rooms or suites of rooms separated from corridors
(2) Where aerosol containers are used, the maximum capacity of the aerosol dispenser shall be 18 oz (0.51 kg) and shall be limited to Level 1 aerosols as defined in NFPA 30B.
(3) In buildings without an automatic sprinkler system, not more than an aggregate 10 gal (37.8 L) of ABHR solution or 1135 oz (32.2 kg) of Level 1 aerosols, or a combination of liquids and Level 1 aerosols not to exceed, in total, the equivalent of 10 gal (37.8 L) or 1135 oz (32.2 kg), shall be in use outside of a storage cabinet in a single smoke compartment or fire compartment or story, whichever is less in area. One dispenser complying with 8.7.3.3.2(1) per room and located in that room shall not be included in the aggregated quantity.
(4) In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, not more than an aggregate 20 gal (75.6 L) of ABHR solution shall be in use outside of a storage cabinet in a single smoke compartment or fire compartment or story, whichever is less in area. One dispenser complying with 8.7.3.3.2(1) per room and located in that room shall not be included in the aggregated quantity.

N **8.7.3.3.3 ABHR Dispenser Location.** The locations of ABHR dispensers shall comply with all of the following:

(1) Dispensers shall not be installed in the following locations:
   (a) Above an ignition source for a horizontal distance of 1 in. (25 mm) to each side of the ignition source
   (b) To the side of an ignition source within a 1 in. (25 mm) horizontal distance from the ignition source
   (c) Beneath an ignition source within a 1 in. (25 mm) vertical distance from the ignition source
(2) Dispensers installed directly over carpeted floors shall be permitted only in sprinklered areas of the building.
(3) ABHR dispensers shall be separated from each other by horizontal spacing of not less than 48 in. (1220 mm).

N **8.7.3.3.4 ABHR Dispenser Operation and Testing.** The operation of dispensers shall comply with all of the following:

(a) Dispensers shall not release their contents except when activated, either manually or automatically by touch-free activation.
(b) Any activation of a dispenser shall only occur when an object is placed within 4 in. (100 mm) of the sensing device.
(c) An object placed within an activation zone and left in place shall not cause more than one activation.
(d) Dispensers shall not dispense more solution than the amount required for hand hygiene consistent with label instructions.
(e) Dispensers shall be designed, constructed, and operated in a manner that ensures accidental or malicious activation of dispensing devices is minimized.
(f) Dispensers shall be tested in accordance with the manufacturer's care and use instructions each time new refills are installed.

N **8.7.3.3.5 Spill Containment and Maintenance.** Maintenance and spill containment of dispensers shall comply with all of the following:

(1) Spill containment for dispensers shall be provided.
(2) Any ABHR solution spilled during a refill process shall be removed following the refill operation.
(3) Catch basins or spill collection means shall be kept free of accumulated ABHR material and refuse.

8.7.4 Laboratories.

8.7.4.1 Laboratories that use chemicals shall comply with NFPA 45 unless otherwise modified by other provisions of this *Code*.

8.7.4.2 Laboratories in health care occupancies and medical and dental offices shall comply with NFPA 99.

8.7.5* Hyperbaric Facilities. All occupancies containing hyperbaric facilities shall comply with NFPA 99 unless otherwise modified by other provisions of this *Code*.

8.8* Inspection and Testing of Door Assemblies. Doors, other than those listed in 8.2.2.4 and 8.3.3.3.1, that are required to be self-closing or automatic closing shall comply with all of the following:

(1) Door assemblies shall be inspected annually.
(2) Doors shall be operated to confirm full closure.
(3) Parts found to be damaged or inoperative shall be replaced.
(4) Door openings and the surrounding areas shall be kept clear of anything that could obstruct or interfere with the free operation of the door.
(5) Blocking or wedging of doors in the open position shall be prohibited.
(6) Self-closing and automatic-closing devices shall be kept in working condition at all times.

Chapter 9 Building Service, Fire Protection, and Life Safety Equipment

9.1 Utilities.

9.1.1 Gas. Equipment using gas and related gas piping shall be in accordance with NFPA 54 or NFPA 58 unless such installations are approved existing installations, which shall be permitted to be continued in service.

9.1.2 Electrical Systems. Electrical wiring and equipment shall be in accordance with *NFPA 70* unless such installations are approved existing installations, which shall be permitted to be continued in service.

9.1.3 Emergency Generators and Standby Power Systems. Where required for compliance with this *Code*, emergency generators and standby power systems shall comply with 9.1.3.1 and 9.1.3.2.

9.1.3.1 Emergency generators and standby power systems shall be installed, inspected, tested, and maintained in accordance with NFPA 110.

9.1.3.2 New generator controllers shall be monitored by the fire alarm system, where provided, or at an attended location, for the following conditions:

(1) Generator running
(2) Generator fault
(3) Generator switch in nonautomatic position

9.1.4 Stored Electrical Energy Systems. Stored electrical energy systems shall be installed, inspected, tested, and maintained in accordance with NFPA 111.

9.1.5 Energy Storage Systems. Energy storage systems shall be in accordance with NFPA 855.

9.2 Heating, Ventilating, and Air-Conditioning.

9.2.1 Air-Conditioning, Heating, Ventilating Ductwork, and Related Equipment. Air-conditioning, heating, ventilating ductwork, and related equipment shall be in accordance with NFPA 90A or NFPA 90B, as applicable, unless such installations are approved existing installations, which shall be permitted to be continued in service.

9.2.2 Ventilating or Heat-Producing Equipment. Ventilating or heat-producing equipment shall be in accordance with NFPA 31, NFPA 54, *NFPA 70*, NFPA 91, or NFPA 211, as applicable, unless such installations are approved existing installations, which shall be permitted to be continued in service.

9.2.3 Commercial Cooking Operations. Where required by another section of this *Code*, commercial cooking operations shall be protected in accordance with NFPA 96 unless such installations are approved existing installations, which shall be permitted to be continued in service.

9.2.4 Ventilating Systems in Laboratories Using Chemicals. Ventilating systems in laboratories using chemicals shall be in accordance with NFPA 45.

9.3 Smoke Control.

9.3.1 Installation. Where required by another section of this *Code*, smoke control systems shall be designed, installed, inspected, tested, and maintained in accordance with NFPA 92, NFPA 204, or nationally recognized standards, engineering guides, or recommended practices, as approved by the authority having jurisdiction.

9.3.2 System Design. The engineer of record shall clearly identify the intent of the system, the design method used, the appropriateness of that method, and the required means of inspecting, testing, and maintaining the system.

9.3.3 Acceptance Testing. Acceptance testing shall be performed by a special inspector in accordance with Section 9.13.

9.3.4 Smoke Control System Operation.

9.3.4.1 Floor- or zone-dependent smoke control systems shall be automatically activated by sprinkler waterflow or smoke detection systems.

9.3.4.2 Means for manual operation of smoke control systems shall be provided at an approved location.

9.3.5 Integrated System Testing. Smoke control systems that are integrated with other fire protection or life safety systems shall be tested in accordance with 9.11.4.2.

9.4 Elevators, Escalators, and Conveyors.

9.4.1* General. An elevator, other than an elevator in accordance with 7.2.13, shall not be considered a component in a required means of egress but shall be permitted as a component in an accessible means of egress.

9.4.2 Code Compliance.

9.4.2.1 Except as modified herein, new elevators, escalators, dumbwaiters, and moving walks shall be in accordance with the requirements of ASME A17.1/CSA B44, *Safety Code for Elevators and Escalators*.

9.4.2.2 Except as modified herein, existing elevators, escalators, dumbwaiters, and moving walks shall be in accordance with the requirements of ASME A17.3, *Safety Code for Existing Elevators and Escalators*.

9.4.2.3 Elevators in accordance with ASME A17.7/CSA B44.7, *Performance-Based Safety Code for Elevators and Escalators*, shall be deemed to comply with ASME A17.1/CSA B44, *Safety Code for Elevators and Escalators*, or ASME A17.3, *Safety Code for Existing Elevators and Escalators*.

9.4.2.4 For other than elevators used for occupant-controlled evacuation in accordance with Section 7.15 and other than existing elevators, the elevator corridor call station pictograph specified in 2.27.9 of ASME A17.1/CSA B44, *Safety Code for Elevators and Escalators*, shall be provided at each elevator landing.

9.4.3 Firefighters' Emergency Operations.

9.4.3.1 All new elevators shall conform to the firefighters' emergency operations requirements of ASME A17.1/CSA B44, *Safety Code for Elevators and Escalators*.

9.4.3.2 All existing elevators having a travel distance of 25 ft (7620 mm) or more above or below the level that best serves the needs of emergency personnel for fire-fighting or rescue purposes shall conform to the firefighters' emergency operations requirements of ASME A17.3, *Safety Code for Existing Elevators and Escalators*.

9.4.4 Number of Cars. The number of elevator cars permitted in a hoistway shall be in accordance with 8.6.9.4.

9.4.5* Elevator Machine Rooms. Elevator machine rooms that contain solid-state equipment for elevators, other than existing elevators, having a travel distance exceeding 50 ft (15 m) above the level of exit discharge, or exceeding 30 ft (9.1 m) below the level of exit discharge, shall be provided with a natural or mechanical means to maintain temperature during firefighters' emergency operations for elevator operation *(see 9.4.3)*. The operating temperature shall be established by the elevator equipment manufacturer's specifications. When standby power is connected to the elevator, the means to control the temperature in the machine room shall be connected to standby power, if applicable.

9.4.6 Elevator Testing.

9.4.6.1 Elevators shall be subject to periodic inspections and tests as specified in ASME A17.1/CSA B44, *Safety Code for Elevators and Escalators*.

9.4.6.2 All elevators equipped with firefighters' emergency operations in accordance with 9.4.3 shall be subject to a monthly operation with a written record of the findings made and kept on the premises as required by ASME A17.1/CSA B44, *Safety Code for Elevators and Escalators*.

9.4.6.3 The elevator inspections and tests required by 9.4.6.1 shall be performed at frequencies complying with one of the following:

(1) Inspection and test frequencies specified in Appendix N of ASME A17.1/CSA B44, *Safety Code for Elevators and Escalators*
(2) Inspection and test frequencies specified by the authority having jurisdiction

9.4.7 Openings to Exit Enclosures. Conveyors, elevators, dumbwaiters, and pneumatic conveyors serving various stories of a building shall not open to an exit enclosure.

9.5 Waste Chutes, Incinerators, and Laundry Chutes.

9.5.1 Enclosure.

9.5.1.1 Waste chutes and laundry chutes shall be separately enclosed by walls or partitions in accordance with the provisions of Section 8.3.

9.5.1.2 Chute intake openings shall be protected in accordance with Section 8.3.

9.5.1.3 The doors of chutes specified in 9.5.1.2 shall open only to a room that is designed and used exclusively for accessing the chute opening.

9.5.1.4 Chute service opening rooms shall be separated from other spaces in accordance with Section 8.7.

9.5.1.5 The requirements of 9.5.1.1 through 9.5.1.4 shall not apply where otherwise permitted by the following:

(1) Existing installations having properly enclosed service chutes and properly installed and maintained chute intake doors shall be permitted to have chute intake doors open to a corridor or normally occupied space.
(2) Waste chutes and laundry chutes shall be permitted to open into rooms not exceeding 400 ft^2 (37 m^2) that are used for storage, provided that the room is protected by automatic sprinklers.

9.5.2 Installation and Maintenance. Waste chutes, laundry chutes, and incinerators shall be installed and maintained in accordance with NFPA 82 unless such installations are approved existing installations, which shall be permitted to be continued in service.

9.6 Fire Detection, Alarm, and Communications Systems.

9.6.1* General.

9.6.1.1 The provisions of Section 9.6 shall apply only where specifically required by another section of this *Code*.

9.6.1.2 Fire detection, alarm, and communications systems installed to make use of an alternative permitted by this *Code* shall be considered required systems and shall meet the provisions of this *Code* applicable to required systems.

9.6.1.3 Fire alarm systems required by this *Code* shall be installed, tested, and maintained in accordance with the applicable requirements of *NFPA 70* and *NFPA 72* unless otherwise permitted by 9.6.1.4.

9.6.1.4 An approved existing installation shall be permitted to be continued in use and shall comply with 9.6.1.5.

9.6.1.5* To ensure operational integrity, the fire alarm system shall have an approved maintenance and testing program complying with the applicable requirements of *NFPA 70* and *NFPA 72*.

9.6.1.6 Fire alarm system impairment procedures shall comply with *NFPA 72*.

9.6.2 Signal Initiation.

9.6.2.1 Where required by other sections of this *Code*, actuation of the fire alarm system shall occur by any or all of the following means of initiation but shall not be limited to such means:

(1) Manual fire alarm initiation
(2) Automatic detection
(3) Extinguishing system operation

9.6.2.2 Manual fire alarm boxes shall be used only for fire-protective signaling purposes. Combination fire alarm and guard's tour stations shall be permitted.

9.6.2.3 A manual fire alarm box shall be provided as follows, unless modified by another section of this *Code*:

(1) For new alarm system installations, the manual fire alarm box shall be located within 60 in. (1525 mm) of exit doorways.
(2) For existing alarm system installations, the manual fire alarm box either shall be provided in the natural exit access path near each required exit or within 60 in. (1525 mm) of exit doorways.

9.6.2.4 Manual fire alarm boxes shall be mounted on both sides of grouped openings over 40 ft (12.2 m) in width, and within 60 in. (1525 mm) of each side of the opening.

9.6.2.5* Additional manual fire alarm boxes shall be located so that, on any given floor in any part of the building, no horizontal distance on that floor exceeding 200 ft (61 m) shall need to be traversed to reach a manual fire alarm box.

9.6.2.6* For fire alarm systems using automatic fire detection or waterflow detection devices to initiate the fire alarm system in accordance with Chapters 11 through 43, not less than one

manual fire alarm box, located as required by the authority having jurisdiction, shall be provided to initiate a fire alarm signal.

9.6.2.7* Manual fire alarm boxes shall be accessible, unobstructed, and visible.

9.6.2.8 Where a sprinkler system provides automatic detection and alarm system initiation, it shall be provided with an approved alarm initiation device that operates when the flow of water is equal to or greater than that from a single automatic sprinkler.

9.6.2.9 Where a total (complete) coverage smoke detection system is required by another section of this *Code*, automatic detection of smoke in accordance with *NFPA 72* shall be provided in all occupiable areas in environments that are suitable for proper smoke detector operation.

9.6.2.10 Smoke Alarms.

Δ **9.6.2.10.1** Where required by another section of this *Code*, single-station and multiple-station smoke alarms shall be in accordance with *NFPA 72* unless otherwise provided in 9.6.2.10.7.1 or 9.6.2.10.8.

9.6.2.10.2 Where automatic smoke detection is required by Chapters 11 through 43, smoke alarms shall not be used as a substitute.

Δ **9.6.2.10.3** In new construction, where required by Chapters 11 through 43, the alarm notification signal in sleeping rooms resulting from activation of smoke alarms shall be a 520 Hz low-frequency signal complying with *NFPA 72*.

N **9.6.2.10.4** The installation of smoke alarms and smoke detectors near stationary or fixed cooking appliances shall be in accordance with *NFPA 72*.

Δ **9.6.2.10.5** The installation of smoke alarms and smoke detectors near a door to a bathroom containing a shower or tub shall be in accordance with *NFPA 72*.

9.6.2.10.6 Smoke alarms, other than battery-operated smoke alarms as permitted by other sections of this *Code*, shall be powered in accordance with the requirements of *NFPA 72*.

N **9.6.2.10.7 Interconnection.**

N **9.6.2.10.7.1*** The interconnection of smoke alarms shall apply only to new construction.

Δ **9.6.2.10.7.2*** In new construction, where two or more smoke alarms are required within a dwelling unit, suite of rooms, or similar area, they shall be arranged so that operation of any smoke alarm shall cause the alarm in all smoke alarms within the dwelling unit, suite of rooms, or similar area to sound, unless otherwise permitted by one of the following:

(1) The requirement of 9.6.2.10.7.2 shall not apply where permitted by another section of this *Code*.
(2) The requirement of 9.6.2.10.7.2 shall not apply to configurations that provide equivalent distribution of the alarm signal.

9.6.2.10.8 System smoke detectors in accordance with *NFPA 72* and arranged to function in the same manner as single-station or multiple-station smoke alarms shall be permitted in lieu of smoke alarms.

9.6.2.10.9 The alarms described in 9.6.2.10.7.2 shall sound only within an individual dwelling unit, suite of rooms, or similar area and shall not actuate the building fire alarm system, unless otherwise permitted by the authority having jurisdiction.

9.6.2.10.10 Smoke alarms shall be permitted to be connected to the building fire alarm system for the purpose of annunciation in accordance with *NFPA 72*.

9.6.3 Occupant Notification.

9.6.3.1 Occupant notification shall be provided to alert occupants of a fire or other emergency where required by other sections of this *Code*.

9.6.3.2 Occupant notification shall be in accordance with 9.6.3.3 through 9.6.3.11.2, unless otherwise provided in 9.6.3.2.1 through 9.6.3.2.4.

9.6.3.2.1* Elevator lobby, hoistway, and associated machine room smoke detectors used solely for elevator recall, and heat detectors used solely for elevator power shutdown, shall not be required to activate the building evacuation alarm if the power supply and installation wiring to such detectors are monitored by the building fire alarm system, and if the activation of such detectors initiates a supervisory signal at a constantly attended location.

9.6.3.2.2* Smoke detectors used solely for closing dampers or heating, ventilating, and air-conditioning system shutdown shall not be required to activate the building evacuation alarm, provided that the power supply and installation wiring to the detectors are monitored by the building fire alarm system, and the activation of the detectors initiates a supervisory signal at a constantly attended location.

9.6.3.2.3* Smoke detectors located at doors for the exclusive operation of automatic door release shall not be required to activate the building evacuation alarm, provided that the power supply and installation wiring to the detectors are monitored by the building fire alarm system, and the activation of the detectors initiates a supervisory signal at a constantly attended location.

9.6.3.2.4 Detectors in accordance with 22.3.4.3.1(2) and 23.3.4.3.1(2) shall not be required to activate the building evacuation alarm.

9.6.3.3 Where required by Chapters 11 through 43, the audible alarm notification signal provided in sleeping rooms resulting from the activation of the fire alarm system or sleeping room smoke detector shall be a 520 Hz low-frequency signal complying with *NFPA 72*.

9.6.3.4 Where permitted by Chapters 11 through 43, a presignal system shall be permitted where the initial fire alarm signal is automatically transmitted without delay to a municipal fire department, to a fire brigade (if provided), and to an on-site staff person trained to respond to a fire emergency.

9.6.3.5 Where permitted by Chapters 11 through 43, a positive alarm sequence shall be permitted, provided that it is in accordance with *NFPA 72*.

9.6.3.6 Unless otherwise provided in 9.6.3.6.1 through 9.6.3.6.8, notification signals for occupants to evacuate shall be by audible and visible signals in accordance with *NFPA 72* and ICC A117.1, *Accessible and Usable Buildings and Facilities*, or other

means of notification acceptable to the authority having jurisdiction.

9.6.3.6.1 Areas not subject to occupancy by persons who are deaf or hard of hearing shall not be required to comply with the provisions for visible signals.

9.6.3.6.2 Visible-only signals shall be provided where specifically permitted in health care occupancies in accordance with Chapters 18 and 19.

9.6.3.6.3 Existing alarm systems shall not be required to comply with the provision for visible signals.

9.6.3.6.4 Visible signals shall not be required in lodging or rooming houses in accordance with Chapter 26.

9.6.3.6.5 Visible signals shall not be required in exit stair enclosures.

9.6.3.6.6 Visible signals shall not be required in elevator cars.

9.6.3.6.7* Public mode visual notification appliances in accordance with *NFPA 72* shall not be required in designated areas as permitted by Chapters 11 through 43, provided that they are replaced with approved alternative visible means.

9.6.3.6.8* Where visible signals are not required, as permitted by 9.6.3.6.7, documentation of such omission shall be maintained in accordance with 9.13.3.

9.6.3.7 The general evacuation alarm signal shall operate in accordance with one of the methods prescribed by 9.6.3.7.1 through 9.6.3.7.3.

9.6.3.7.1 The general evacuation alarm signal shall operate throughout the entire building other than the locations described in 9.6.3.7.4 and 9.6.3.7.5.

9.6.3.7.2* Where total evacuation of occupants is impractical due to building configuration, only the occupants in the affected zones shall be initially notified, and provisions shall be made to selectively notify occupants in other zones to afford orderly evacuation of the entire building, provided that such arrangement is approved by the authority having jurisdiction.

9.6.3.7.3 Where occupants are incapable of evacuating themselves because of age, physical or mental disabilities, or physical restraint, all of the following shall apply:

(1) The private operating mode, as described in *NFPA 72* shall be permitted to be used.
(2) Only the attendants and other personnel required to evacuate occupants from a zone, area, floor, or building shall be required to be notified.
(3) Notification of personnel as specified in 9.6.3.7.3(2) shall include means to readily identify the zone, area, floor, or building in need of evacuation.

9.6.3.7.4 The general evacuation signal shall not be required in exit stair enclosures.

9.6.3.7.5 The general evacuation signal shall not be required in elevator cars.

9.6.3.8 Audible alarm notification appliances shall be of such character and so distributed as to be effectively heard above the average ambient sound level that exists under normal conditions of occupancy.

9.6.3.9 Audible alarm notification appliances shall produce signals that are distinctive from audible signals used for other purposes in a given building.

9.6.3.10 Automatically transmitted or live voice evacuation or relocation instructions shall be permitted to be used to notify occupants and shall comply with either 9.6.3.10.1 or 9.6.3.10.2.

9.6.3.10.1 Automatically transmitted or live voice evacuation or relocation instructions shall be in accordance with *NFPA 72*.

9.6.3.10.2* Where permitted by Chapters 11 through 43, automatically transmitted or live voice announcements shall be permitted to be made via a voice communication or public address system that complies with all of the following:

(1) Occupant notification, either live or recorded, shall be initiated at a constantly attended receiving station by personnel trained to respond to an emergency.
(2) An approved secondary power supply shall be provided for other than existing, previously approved systems.
(3) The system shall be audible above the expected ambient noise level.
(4) Emergency announcements shall take precedence over any other use.

9.6.3.11 Unless otherwise permitted by another section of this *Code*, audible and visible fire alarm notification appliances shall comply with either 9.6.3.11.1 or 9.6.3.11.2.

9.6.3.11.1 Audible and visible fire alarm notification appliances shall be used only for fire alarm system or other emergency purposes.

9.6.3.11.2 Emergency voice/alarm communication systems shall be permitted to be used for other purposes in accordance with *NFPA 72*.

9.6.4 Emergency Forces Notification.

9.6.4.1 Where required by another section of this *Code*, emergency forces notification shall be provided to alert the municipal fire department and fire brigade (if provided) of fire or other emergency.

9.6.4.2 Where emergency forces notification is required by another section of this *Code*, the fire alarm system shall be arranged to transmit the alarm automatically via any of the following means acceptable to the authority having jurisdiction and shall be in accordance with *NFPA 72*:

(1) Auxiliary fire alarm system
(2) Central station fire alarm system
(3) Proprietary supervising station fire alarm system
(4) Remote supervising station fire alarm system

Δ **9.6.4.3** For existing installations where none of the means of notification specified in 9.6.4.2(1) through 9.6.4.2(4) are available, an approved plan for notification of the municipal fire department shall be permitted.

9.6.4.4 For other than existing installations, where fire alarm systems are required to provide emergency forces notification, supervisory signals and trouble signals shall sound and be visibly displayed either at an approved, remotely located receiving facility or at a location within the protected building that is constantly attended by qualified personnel.

9.6.5* Monitor-It-Yourself (MIY) Systems. The use of a monitor-it-yourself (MIY) system that transmits directly to an