

NFPA 101®

Life Safety Code®

2000 Edition



National Fire Protection Association, 1 Batterymarch Park, PO Box 9101, Quincy, MA 02269-9101
An International Codes and Standards Organization

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NFPA 101®
Life Safety Code®

2000 Edition

This edition of the *Life Safety Code* was adopted by the National Fire Protection Association, Inc., at its November Meeting held November 14–17, 1999, in New Orleans, LA. It was issued by the Standards Council on January 14, 2000, with an effective date of February 11, 2000, and supersedes all previous editions.

This edition of NFPA 101 was approved as an American National Standard on February 11, 2000.

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, etc., 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 Night Club 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 the Wincoff, 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, as 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 in 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 the *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 three-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 Appendixes F and 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. Appendixes C through 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, 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 introduces a performance-based option via Section 4.4 and new Chapter 5. This edition also reformats the *Code* for substantial compliance with the NFPA *Manual of Style*: (1) former Chapter 1, General, has been split into Chapter 1, Administration, and Chapter 4, General, (2) the mandatory references list has been moved from Chapter 33 to Chapter 2, (3) all definitions have been located in Chapter 3 and each defined term has been numbered, (4) the paragraph numbering scheme that separated the chapter number from the section number by a hyphen has been changed to use a decimal point as the separator, and (5) the appendixes have been renamed annexes. Former Chapter 32 on special structures and highrise buildings has been 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 has been moved from Section 6.5 into a separate new chapter, Chapter 10. The occupancy chapter numbers, formerly 8 through 32, have become 12 through 42 with some repositioning of chapters. For example, the day-care occupancies chapters have been renumbered from 30/31 to 16/17 so as to be positioned immediately after the chapters for educational occupancies.

To the User

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*, 8th edition, available from NFPA. Further information on these seminars is available through NFPA’s Division of Continuing Education.

Essentially, the *Code* is comprised of four major parts. The first part consists of Chapters 1 through 4 and 6 through 11; 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 Annexes A and B, which contain useful additional information.

A thorough understanding of Chapters 1 through 4 and 6 through 11 is necessary to use the *Code* effectively, as 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 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 term “where permitted by Chapters 12 through 42” appears. When this appears, that provision can be used only where specifically allowed by an occupancy chapter. For example, the provisions of 7.2.1.6.1 on delayed egress locks are allowed only when permitted by Chapters 12 through 42. Permission to use the delayed egress lock is normally found in the “____.2.2” subsection of each occupancy chapter. For example, 12.2.2.2.4 specifically allows the use of delayed egress locks in new assembly occupancies. If this permission is not found in an occupancy chapter, the delayed egress lock cannot be used. Similar types of restricted permission are found for such items as security grilles, double cylinder locks, revolving doors, etc. In other locations in the base chapters, the term “unless prohibited by Chapters 12 through 42” is used. In this case, the provision is allowed 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*, values for measurements are followed by an equivalent in SI units. The first stated value is regarded as the requirement, because the given equivalent value may be approximate.

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

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

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Committee Scope: This Committee shall have primary responsibility for documents on protection of human life 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 (SAF-END)
(Chapters 14, 15, 16, and 17)

Catherine L. Stashak, *Chair*
Des Plaines Fire Dept., IL [E]

Ron Coté, *Nonvoting Secretary*
Nat'l Fire Protection Assn., MA

Scott R. Bartlett, Simplex Time Recorder Co., MA [M]
Samuel S. Dannaway, S. S. Dannaway Assoc., Inc., HI [SE]
Victor L. Dubrowski, Code Consultants Inc., MO [SE]
Stephen E. Duffin, Zurich Services Corp., IL [I]
Gene B. Endthoff, Nat'l Fire Sprinkler Assn., IL [M]
Lance J. Ewing, School District of Philadelphia, PA [U]
Douglas R. Freels, Performance Design Technologies, LLC, TN [SE]

Vern L. Martindale, Church of Jesus Christ of Latter-Day Saints, UT [U]
Michael L. Sinsigalli, Windsor Locks Fire Dept., CT [E]
Aleksy L. Szachnowicz, Prince George's County Gov't Board of Education, MD [E]
Robert T. Trotter, Franklin Fire Dept., TN [U]
Ralph J. Warburton, University of Miami, FL [SE]
Carl F. Weaver, Brevard Community College, FL [SE]
Kenneth Wood, Illinois State Fire Marshals Office, IL [E]

Alternate

Roger B. Rudy, Performance Design Technologies, LLC, TN [SE]
(Alt. to D. R. Freels)

Ron Coté, NFPA Staff Liaison

Committee Scope: This Committee shall have primary responsibility for documents on protection of human life 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 (SAF-FIR)
(Chapter 8)

John W. McCormick, Chair
Code Consultants Inc., MO [SE]

Walter P. Sterling, Nonvoting Secretary
Nat'l Fire Protection Assn., MA

Carl F. Baldassarra, Schirmer Engr Corp., IL [SE]
John F. Bender, Maryland State Fire Marshals Office, MD [E]
Rep. Int'l Fire Marshals Assn.
Robert M. Berhinig, Underwriters Laboratories Inc., IL [RT]
Joseph A. Brooks, Air Movement and Control Assn. Int'l, Inc., IL [M]
Edward K. Budnick, Hughes Assoc. Inc., MD [SE]
Gregory J. Cahanin, St. Petersburg, FL [U]
Rep. Louisiana State Fireman's Assn.
Raman B. Chauhan, Nat'l Research Council of Canada, Ontario, Canada [RT]
Eric Cote, Rolf Jensen & Assoc., Inc., MA [SE]
Thomas G. Daly, Hilton Hotels Corp., CA [U]
Rep. NFPA Lodging Industry Section
Brian L. Eklow, AON Risk Services, IL [I]
Gene B. Endthoff, Nat'l Fire Sprinkler Assn., IL [M]
Sam W. Francis, American Forest & Paper Assn., PA [M]
Ralph Gerdes, Ralph Gerdes Consultants, LLC, IN [SE]
Donald Murray Goff, Hillsborough County Fire Rescue, FL [E]
Rep. Florida Fire Marshals Assn.

Miles J. Haber, Monument Construction, Inc., MD [IM]
Rep. Nat'l Assn. of Home Builders
Dale D. Hasty, Cerberus Pyrotronics, MO [M]
Rep. Fire Suppression Systems Assn.
Wayne D. Holmes, HSB Professional Loss Control, Inc., CT [I]
Jonathan Humble, American Iron and Steel Inst., CT [M]
Tod L. Jilg, Hoechst Celanese Corp., NC [M]
Rep. American Fiber Mfrs. Assn.
Donald L. King, Steelcraft Mfg. Co., OH [M]
Rep. Steel Door Inst.
Marshall A. Klein, Marshall A. Klein & Assoc., Inc., MD [SE]
Richard F. Lattey, Liberty Mutual Insurance Group, MA [I]
Rep. The Alliance of American Insurers
Joseph J. Messersmith, Jr., Portland Cement Assn., VA [M]
Diane V. Steiger, CIGNA Loss Control Services, NJ [I]
Rep. American Insurance Services Group
Sharon M. Stone, Koffel Assoc., Inc., MD [SE]
Kenneth Wood, Illinois State Fire Marshals Office, IL [E]

Alternates

Robert H. Barker, American Fiber Mfrs. Assn., DC [M]
(Alt. to T. L. Jilg)
Kenneth E. Bland, American Forest & Paper Assn., DC [M]
(Alt. to S. W. Francis)
Delbert F. Boring, Jr., American Iron & Steel Inst., OH [M]
(Alt. to J. Humble)
Lawrence Brown, Nat'l Assn. of Home Builders (NAHB), DC [IM]
(Alt. to M. J. Haber)
David Cook, Ralph Gerdes Consultants, IN [SE]
(Alt. to R. Gerdes)
John F. Devlin, Schirmer Engr Corp., VA [SE]
(Alt. to C. F. Baldassarra)

Jack Gump, HSB Professional Loss Control, TN [I]
(Alt. to W. D. Holmes)
Daniel J. Harrington, CGU Insurance, NY [I]
(Alt. to D. V. Steiger)
Mark Kløver, Portland Cement Assn., CA [M]
(Alt. to J. J. Messersmith, Jr.)
William E. Koffel, Jr., Koffel Assoc., Inc., MD [SE]
(Alt. to S. M. Stone)
David A. Lewis, Code Consultants Inc., MO [SE]
(Alt. to J. W. McCormick)
Jeffrey A. Maddox, Rolf Jensen & Assoc., Inc., CA [SE]
(Alt. to E. Cote)
Eric Rosenbaum, Hughes Assoc., Inc., MD [SE]
(Alt. to E. K. Budnick)

Nonvoting

Michael Earl Dillon, Dillon Consulting Engr, Inc., CA
Rep. Technical Committee on Air Conditioning

Walter P. Sterling, NFPA Staff Liaison

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

Technical Committee on Fundamentals (SAF-FUN)
(Chapters 1 through 6)

John M. Watts, Jr., *Chair*
Fire Safety Inst., VT [SE]

Ron Coté, *Nonvoting Secretary*
Nat'l Fire Protection Assn., MA

Wayne G. (Chip) Carson, Carson Assoc., Inc., VA [SE]
Gregory W. Gallagher, New York State Dept. of State, NY [E]
Norman E. Groner, Santa Cruz, CA [SE]
Howard Hopper, Underwriters Laboratories Inc., CA [RT]
Morgan J. Hurley, Society of Fire Protection Engr, MD [U]
David P. Klein, U.S. Dept. of Veterans Affairs, MD [U]
James K. Lathrop, Koffel Assoc., CT [SE]

Richard A. Morris, Nat'l Assn. of Home Builders, DC [IM]
Walter Smittle, III, West Virginia State Fire Marshals Office, WV [E]
Rep. Int'l Fire Marshals Assn.
David W. Stroup, U.S. Nat'l Inst. of Standards & Technology, MD [RT]
Joy Woodward, Int'l Conference of Bldg. Officials, MO [E]

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(Alt. to D. P. Klein)
Brian J. Meacham, Society of Fire Protection Engr, MA [U]
(Alt. to M. J. Hurley)

Nonvoting

Carol Caldwell, Caldwell Consulting, Ltd, New Zealand

Ron Coté, NFPA Staff Liaison

Committee Scope: This Committee shall have primary responsibility for documents on the basic objectives, requirements, and definitions 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 Furnishings and Contents (SAF-FUR)
(Chapter 10)

Gerald E. Lingenfelter, Chair
American Insurance Services Group Inc., NY [I]

Ron Coté, Nonvoting Secretary
Nat'l Fire Protection Assn., MA

Patty K. Adair, American Textile Mfrs. Inst., DC [M]
Alastair J. M. Aikman, Nat'l Research Council of Canada,
Ontario, Canada [RT]
Vytenis Babrauskas, Fire Science and Technology Inc., MD
[SE]
John A. Blair, The DuPont Co., DE [M]
Richard W. Bukowski, U.S. Nat'l Inst. of Standards & Tech-
nology, MD [RT]
Eugene A. Cable, U.S. Dept. of Veterans Affairs, NY [U]
Frederic B. Clarke, Benjamin/Clarke Assoc., Inc., MD [SE]

Paul Dillon, Southern College of Technology, GA [M]
Rep. Sleep Products Safety Council
William E. Fitch, Omega Point Laboratories Inc., TX [RT]
Marcelo M. Hirschler, GBH Int'l, CA [SE]
Alfred J. Hogan, Reedy Creek Improvement District, FL
[E]
E. Ken McIntosh, The Carpet and Rug Inst., GA [M]
T. Hugh Talley, Hugh Talley Co., TN [M]
Rep. American Furniture Mfrs. Assn.
James J. Urban, Underwriters Laboratories Inc., IL [RT]

Alternates

Donald W. Belles, Koffel Assoc., Inc., TN [M]
(Alt. to E. K. McIntosh)
Raman B. Chauhan, Nat'l Research Council of Canada, On-
tario, Canada [M]
(Alt. to A. J. M. Aikman)
John W. Michener, Milliken Research Corp., SC [M]
(Alt. to P. K. Adair)

Thomas J. Ohlemiller, Nat'l Inst. of Standards & Technolo-
gy, MD [RT]
(Alt. to R. W. Bukowski)
James V. Ryan, Potomac, MD [SE]
(Alt. to F. B. Clarke)

Nonvoting

James F. Hoebel, U.S. Consumer Product Safety Commis-
sion, MD [C]

Hammad Malik, U.S. Consumer Product Safety Commis-
sion, MD [C]
(Alt. to J. F. Hoebel)

Ron Coté, NFPA Staff Liaison

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

Technical Committee on Health Care Occupancies (SAF-HEA)
(Chapters 18, 19, 20, and 21)

Wayne G. (Chip) Carson, Chair
Carson Assoc., Inc., VA [SE]

Ron Coté, Nonvoting Secretary
Nat'l Fire Protection Assn., MA

Kenneth E. Bush, Maryland State Fire Marshals Office, MD [E]

Rep. Int'l Fire Marshals Assn.

Michael Crowley, Rolf Jensen & Assoc., Inc., TX [SE]

Douglas S. Erickson, American Society for Healthcare Engr, IL [U]

Kenneth S. Faulstich, U.S. Dept. of Veterans Affairs, DC [U]

John E. Fishbeck, Joint Commission on Accreditation of Healthcare Orgs., IL [E]

Curt Fogel, Phico Insurance Co., ND [I]

Thomas W. Jaeger, Gage-Babcock & Assoc. Inc., VA [U]
Rep. American Health Care Assn.

Ronald K. Mengel, Pittway Systems Technology Group, IL [M]

Rep. Nat'l Electrical Mfrs. Assn.

Daniel J. O'Connor, Schirmer Engr Corp., IL [SE]

Kirby W. Perry, Kirby W. Perry Architects & Assoc. Inc., TX [SE]

Rep. American Inst. of Architects

Peter P. Petresky, Pennsylvania Dept. of Health, PA [E]

Rep. Assn. of Health Facility Survey Agencies

Brian Prediger, U.S. Army, MD [U]

Thomas A. Salamone, Kemper Nat'l Insurance Cos., NY [I]

David M. Sine, David M. Sine & Assoc., TX [U]

Rep. Nat'l Assn. of Psychiatric Health Systems

Richard D. Strub, Life Care Centers of America, TN [U]

Rep. NFPA Health Care Section

Mayer D. Zimmerman, U.S. Dept. of Health & Human Services Health Care Financing Admin., MD [E]

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James R. Ambrose, Code Consultants Inc., MO [SE]
(Vot. Alt. to CCI Rep.)

James H. Antell, Rolf Jensen & Assoc., Inc., IL [SE]
(Alt. to M. Crowley)

John F. Deubler, Schirmer Engr Corp., IL [SE]
(Alt. to D. J. O'Connor)

J. Richard Fruth, Hayes Large Architects, PA [SE]
(Alt. to K. W. Perry)

Ron Coté, NFPA Staff Liaison

William E. Koffel, Jr., Koffel Assoc., Inc., [U]
(Alt. to D. S. Erickson)

Steven J. Nolin, Simplex Time Recorder Co., MA [M]
(Alt. to R. K. Mengel)

Edward M. Shedlock, U.S. Dept. of Veterans Affairs, FL [U]
(Alt. to K. S. Faulstich)

John S. Taylor, St. Vincent's Hospital, AL [U]
(Alt. to R. D. Strub)

Committee Scope: This Committee shall have primary responsibility for documents on protection of human life 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 (SAF-IND)
(Chapters 11, 40, and 42)

Gregory W. Thomas, *Chair*
Liberty Mutual Group, CT [I]
Rep. The Alliance of American Insurers

Walter P. Sterling, *Nonvoting Secretary*
Nat'l Fire Protection Assn., MA

Donald C. Birchler, FP&C Consultants Inc., MO [SE]
Howard M. Bucci, U.S. DOE-Fluor Daniel Hanford, WA [U]

John E. Echternacht, Firesafety Consultants, TX [SE]

John F. Farney, Jr., Sargent & Lundy Engr, IL [SE]

Larry N. Garrett, General Motors Corp., IN [U]

Rep. NFPA Industrial Fire Protection Section
Bruce W. Hisley, Nat'l Fire Academy FEMA, U.S. Fire Administration, MD [E]

Rep. Int'l Fire Marshals Assn.

Wayne D. Holmes, HSB Professional Loss Control Inc., CT [I]

Neal W. Krantz, Simplex, MI [M]

Rep. Nat'l Electrical Mfrs. Assn.

Robert L. Smith, Jr., Westinghouse Savannah River Co., SC [U]

Michael J. Stelzer, ABB Lummus Crest, Inc., TX [SE]

Rep. American Society of Safety Engr

Robert Bruce Wallace, Royal Insurance Co., CA [I]

Rep. American Insurance Services Group, Inc.

Alternate

Jack Gump, HSB Professional Loss Control, TN [I]
(Alt. to W. D. Holmes)

Nonvoting

Glen E. Gardner, U.S. Occupational Safety & Health Administration, DC

Walter P. Sterling, NFPA Staff Liaison

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

Technical Committee on Means of Egress (SAF-MEA)
(Chapter 7)

William E. Koffel, Jr., Chair
Koffel Assoc., Inc., MD [SE]

Ron Coté, Nonvoting Secretary
Nat'l Fire Protection Assn., MA

Alastair J. M. Aikman, Nat'l Research Council of Canada, Ontario, Canada [RT]

John L. Barrios, Tampa Dept. of Business & Community Services, FL [E]

Rep. Southern Bldg. Code Congress Int'l Inc.

Lawrence Brown, Nat'l Assn. of Home Builders (NAHB), DC [IM]

John L. Bryan, Frederick, MD [SE]

Kenneth E. Bush, Maryland State Fire Marshals Office, MD [E]

Rep. Int'l Fire Marshals Assn.

Davie J. Camp, Dover Elevator Systems, Inc., TN [M]

Rep. Nat'l Elevator Industry, Inc.

David A. de Vries, American Society of Safety Engr, IL [U]

Steven DiPilla, CIGNA Loss Control Services, NJ [I]

Joshua W. Elvove, Veterans Administration Medical Center, CO [U]

Gene B. Endthoff, Nat'l Fire Sprinkler Assn., IL [M]

Philip C. Favro, Philip C. Favro & Assoc., CA [SE]

Edward L. Fixen, Schirmer Engr Corp., CA [SE]

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

David A. Gilda, Builders Hardware Mfrs. Assn., CT [M]

Billy G. Helton, Lithonia Emergency Systems, GA [M]

Rep. Nat'l Electrical Mfrs. Assn.

Daniel Madrzykowski, U.S. Nat'l Inst. of Standards & Technology, MD [RT]

Lawrence J. McGinty, U.S. Central Intelligence Agency, DC [U]

Wayne Menuz, Underwriters Laboratories Inc., CA [RT]

Gene V. Paolucci, Yasuda Fire & Marine Insurance Co. of America, NY [I]

Rep. American Insurance Services Group, Inc.

Jake Pauls, Jake Pauls Consulting Services in Bldg. Use and Safety, MD [SE]

Eric Rosenbaum, Hughes Assoc., Inc., MD [SE]

Leslie Strull, Rolf Jensen & Assoc., Inc., IL [SE]

Michael D. Tomy, Heery Int'l. Inc., GA [SE]

Rep. American Inst. of Architects

Joseph H. Versteeg, Torrington, CT [E]

Rep. Fairfield, Connecticut, Fire Marshals Office

David L. Wismer, Philadelphia Dept. of Licenses & Inspections, PA [E]

Rep. Bldg. Officials & Code Administrators Int'l, Inc.

Jay Woodward, Int'l Conference of Bldg. Officials, CA [E]

Alternates

John R. Battles, Southern Bldg. Code Congress Int'l, AL [E]

(Alt. to J. L. Barrios)

Charles H. Berry, Baltimore VA Medical Center, MD [U]

(Alt. to J. W. Elvove)

Warren D. Bonisch, Schirmer Engr Corp., TX [SE]

(Alt. to E. L. Fixen)

Raman B. Chauhan, Nat'l Research Council of Canada, Ontario, Canada [RT]

(Alt. to A. J. M. Aikman)

Paul Christensen, Prescolite, CA [M]

(Alt. to B. G. Helton)

Edward A. Donoghue, Edward A. Donoghue Assoc., Inc., NY [M]

(Alt. to D. J. Camp)

Ron Coté, NFPA Staff Liaison

Miles J. Haber, Monument Construction Inc., MD [M]

(Alt. to L. Brown)

James K. Lathrop, Koffel Assoc., CT [SE]

(Alt. to W. E. Koffel, Jr.)

James A. Milke, University of Maryland, MD [SE]

(Alt. to J. L. Bryan)

Harold E. Nelson, Hughes Assoc., Inc., MD [SE]

James R. Quiter, Rolf Jensen & Assoc., Inc., CA [SE]

(Alt. to L. Strull)

Roy W. Schwarzenberg, U.S. Central Intelligence Agency, DC [U]

(Alt. to L. J. McGinty)

Michael Shulman, Underwriters Laboratories Inc., CA [RT]

(Alt. to W. Menuz)

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 (SAF-MER)
(Chapters 36, 37, 38, and 39)

Ed Schultz, Chair
Code Consultants Inc., MO [SE]

Walter P. Sterling, Nonvoting Secretary
Nat'l Fire Protection Assn., MA

David M. Banwarth, Prince George's County Gov't, MD [E]
E. Joseph Bocci, U.S. Dept. of the Treasury, DC [U]
Kenneth E. Bush, Maryland State Fire Marshals Office, MD [E]

Rep. Int'l Fire Marshals Assn.

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Douglas S. Erickson, American Society of Healthcare Engr, IL [U]

Sam W. Francis, American Forest & Paper Assn., PA [M]

Douglas R. Freels, Performance Design Technologies, LLC, TN [SE]

Daniel J. Gauvin, Simplex Time Recorder Co., MA [M]

Rep. Nat'l Electrical Mfrs. Assn.

Darrell W. Harguth, Fire Equipment Mfrs. Assn., Inc., CA [M]

Wayne D. Holmes, HSB Industrial Risk Insurers, CT [I]
Jonathan Humble, American Iron and Steel Inst., CT [M]
Richard F. Lattey, Liberty Mutual Insurance Group, MA [I]

Rep. The Alliance of American Insurers

Daniel Madrzykowski, U.S. Nat'l Inst. of Standards & Technology, MD [RT]

Brian L. Marburger, Kemper Nat'l Insurance Cos., IL [I]

Rep. American Insurance Services Group, Inc.

Richard V. Moon, Insurance Services Office, NY [I]

Richard R. Osman, Schirmer Engr Corp., IL [SE]

Lawrence G. Perry, Bldg. Owners & Managers Assn. Int'l, MD [U]

William J. Tomes, TVA Fire and Life Safety, GA [U]

Rep. Home Depot

Alternates

James P. Begley, Performance Design Technologies, LLC, TN [SE]

(Alt. to D. R. Freels)

Delbert F. Boring, Jr., American Iron & Steel Inst., OH [M]

(Alt. to J. Humble)

Jack Gump, HSB Professional Loss Control, TN [I]

(Alt. to W. D. Holmes)

Eugene A. LaValle, Sentrol, Inc., GA [M]

(Alt. to D. J. Gauvin)

Cory Makoff, Kemper Insurance Cos., GA [I]

(Alt. to B. L. Marburger)

George Mills, American Society for Healthcare Engr (ASHE), IL [U]

(Alt. to D. S. Erickson)

Sheldon S. Rucinski, Schirmer Engr Corp., IL [SE]

(Alt. to R. R. Osman)

David W. Stroup, U.S. Nat'l Inst. of Standards & Technology, MD [RT]

(Alt. to D. Madrzykowski)

Walter P. Sterling, NFPA Staff Liaison

Committee Scope: This Committee shall have primary responsibility for documents on protection of human life 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 (SAF-RES)

(Chapters 24, 26, 28, 29, 30, and 31)

Joseph M. Jardin, ChairNew York City Fire Dept., NY [C]
Rep. NFPA Fire Service Section**James D. Lake, Nonvoting Secretary**

Nat'l Fire Protection Assn., MA

Carl F. Baldassarra, Schirmer Engr Corp., IL [SE]
H. Wayne Boyd, U.S. Safety & Engr Corp., CA [M]
Harry L. Bradley, Maryland State Fire Marshals Office, MD [E]
 Rep. Int'l Fire Marshals Assn.
Ronald M. Brave, Snow Country Development LLC, CO [IM]
 Rep. Nat'l Assn. of Home Builders
Richard W. Bukowski, U.S. Nat'l Inst. of Standards & Technology, MD [RT]
Peter G. Christie, TAA Ltd., MD [SE]
Thomas G. Daly, Hilton Hotels Corp., CA [U]
 Rep. NFPA Lodging Industry Section
William R. DesPres, Royal Insurance, NC [I]
 Rep. American Insurance Services Group, Inc.
Sam W. Francis, American Forest & Paper Assn., PA [M]
Ralph Gerdes, Ralph Gerdes Consultants, IN [SE]
Kenneth E. Isman, Nat'l Fire Sprinkler Assn., NY [M]

Robert Kelly, Washington County, OR [E]
Marshall A. Klein, Marshall A. Klein & Assoc., Inc., MD [SE]
James K. Lathrop, Koffel Assoc., CT [SE]
Eugene A. LaValle, Sentrol, Inc., NE [M]
 Rep. Nat'l Electrical Mfrs Assn.
Joseph J. Messersmith, Jr., Portland Cement Assn., VA [M]
Ronald G. Nickson, Nat'l Multi-Housing Council, DC [U]
Michael A. O'Hara, The MountainStar Group, MN [SE]
Erin A. M. Oneisom, U.S. Air Force, Civil Engr Support Agency, FL [U]
Peter Puhlick, University of Connecticut, CT [U]
Jim V. Ray, Marriott Int'l, Inc., DC [U]
 Rep. American Hotel & Motel Assn.
Vincent E. Sbarra, Gage-Babcock & Assoc., Inc., NY [SE]
T. Hugh Talley, Hugh Talley Co., TN [M]
 Rep. American Furniture Mfrs. Assn.

Alternates

James R. Bell, Marriott Corp. DC [U]
 (Alt. to J. V. Ray)
Kenneth E. Bland, American Forest & Paper Assn., DC [M]
 (Alt. to S. W. Francis)
Warren D. Bonisch, Schirmer Engr Corp. TX [SE]
 (Alt. to C. F. Baldassarra)
Lawrence Brown, Nat'l Assn. of Home Builders (NAHB), DC [IM]
 (Alt. to R. M. Brave)
David Cook, Ralph Gerdes Consultants, IN [SE]
 (Alt. to R. Gerdes)
Russell P. Fleming, Nat'l Fire Sprinkler Assn., NY [M]
 (Alt. to K. E. Isman)

Greg Gottlieb, Hauppauge Fire District, NY [C]
 (Alt. to J. M. Jardin)
Robert Howe, Vermont Dept. of Labor & Industry, VT [E]
 (Alt. to H. L. Bradley)
Robert J. James, MountainStar Enterprises, Ltd., MN [SE]
 (Alt. to M. A. O'Hara)
Ronald H. Kirby, Simplex Time Recorder Co., MA [M]
 (Alt. to E. A. LaValle)
Mark Kluver, Portland Cement Assn., CA [M]
 (Alt. to J. J. Messersmith, Jr.)
Alfred J. Longhitano, Gage-Babcock & Assoc. Inc., NY [SE]
 (Alt. to V. E. Sbarra)

James D. Lake, NFPA Staff Liaison

These lists represent the membership at the time the Committees were balloted on the final text of this edition. Since that time, changes in the membership may have occurred. A key to classifications is found at the back of the document.

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 from fire and other circumstances producing similar consequences, and on the emergency movement of people, in hotels, dormitories, apartments, lodging and rooming houses, and one- and two-family dwellings.

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NFPA 101®

Code for

Safety to Life from Fire in Buildings and Structures

2000 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.

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

Changes other than editorial are indicated by a vertical rule in the margin of the pages on which they appear. These lines are included as an aid to the user in identifying changes from the previous edition.

Chapter 1 ADMINISTRATION

SECTION 1.1 TITLE

1.1.1 Code Title. NFPA 101®, *Code for Safety to Life from Fire in Buildings and Structures*, shall be known as the *Life Safety Code*®, is cited as such, and shall be referred to herein as “this *Code*” or “the *Code*.”

SECTION 1.2* SCOPE

1.2.1* Danger to Life from Fire. The *Code* addresses those construction, protection, and occupancy features necessary to minimize danger to life from fire, including smoke, fumes, or panic.

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

1.2.3 Other 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.

1.2.4 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 personal injuries incurred by an individual's own negligence
- (3) Preservation of property from loss by fire

SECTION 1.3* PURPOSE

1.3.1* Code 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.

SECTION 1.4* APPLICATION

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

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

SECTION 1.5 EQUIVALENCY

1.5.1* 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*. Technical documentation shall be submitted to the authority having jurisdiction to demonstrate equivalency. The system, method, or device shall be approved for the intended purpose by the authority having jurisdiction.

1.5.2* 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*.

SECTION 1.6 UNITS AND FORMULAS

1.6.1 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).

1.6.2 Primary and Equivalent Values. If a value for a measurement as given in this *Code* is followed by an equivalent value in other units, the first stated value shall be regarded as the requirement. A given equivalent value might be approximate.

1.6.3 Conversion Procedure. SI units have been converted by multiplying the quantity by the conversion factor and then rounding the result to the appropriate number of significant digits.

SECTION 1.7 ENFORCEMENT

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

Chapter 2 MANDATORY REFERENCES

NOTE: (See Annex B for other referenced publications that are advisory and thus do not constitute part of the requirements of this Code.)

2.1 The following documents or portions thereof are referenced within this Code as mandatory requirements and shall be considered part of the requirements of this Code. The edition indicated for each referenced mandatory document is the current edition as of the date of the NFPA issuance of this Code. Some of these mandatory documents might also be referenced in this Code for specific informational purposes and, therefore, are also listed in Annex B.

The numbers in parentheses represent the paragraph numbers from chapters of this Code that reference the given publication in a mandatory way.

The Committee on Safety to Life recognizes that it is sometimes impractical to continually upgrade existing buildings or installations to comply with all the requirements of the following referenced publications. Existing buildings or installations that do not comply with the provisions of the following referenced publications shall be permitted to be continued in service, provided the lack of conformity with these standards does not present a serious hazard to the occupants as determined by the authority having jurisdiction.

2.1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

NFPA 10, *Standard for Portable Fire Extinguishers*, 1998 edition. (9.7.4.1)

NFPA 13, *Standard for the Installation of Sprinkler Systems*, 1999 edition. [8.2.5.12 Exc. No. 1, 9.7.1.1, 9.7.4.2, 12.4.5.7, 12.4.5.12, 12.7.4.3.7 Exc. No. 1, 13.4.5.12, 13.7.4.3.7 Exc. No. 1, 18.3.5.5, 19.3.5.5, 26.3.5.1 Exc. No. 1, 28.1.5, 28.3.5.1 Exc., 29.1.5, 29.3.5.1 Exc. No. 1, 30.3.5.1 Exc. No. 1, 30.3.5.1 Exc. No. 2, 31.2.2.1.3, 31.3.5.1 Exc. No. 2, 32.2.3.5.2 Exc. No. 3, 33.2.3.5.2 Exc. No. 3, 36.4.4.2.5(2), 36.4.5.3.1(1), 36.4.5.5(1), 37.4.4.2.5(2), 37.4.5.3.1(1), 37.4.5.5(1), 38.1.5.2, 39.1.5.2]

NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*, 1999 edition. [9.7.1.1 Exc. No. 2, 24.3.5, 26.3.5.1, 32.2.3.5.2 Exc. No. 1, 32.2.3.5.2 Exc. No. 2, 33.2.3.5.2 Exc. No. 1, 33.2.3.5.2 Exc. No. 2]

NFPA 13R, *Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height*, 1999 edition. [9.7.1.1 Exc. No. 1, 24.3.5, 26.3.5.1, 28.3.5.1, 29.3.5.1, 30.3.5.1, 31.3.5.1, 32.2.3.5.2 Exc. No. 4, 32.2.3.5.2 Exc. No. 5, 32.3.3.5.1 Exc. No. 1, 33.2.3.5.2 Exc. No. 4, 33.2.3.5.2 Exc. No. 5, 33.3.3.5.1 Exc. No. 1]

NFPA 14, *Standard for the Installation of Standpipe, Private Hydrants, and Hose Systems*, 2000 edition. (9.7.4.2, 12.4.5.12, 13.4.5.12)

NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*, 1998 edition. (9.7.5, 9.7.6.2)

NFPA 30, *Flammable and Combustible Liquids Code*, 1996 edition. [8.4.3.1, 36.4.5.3.1(2), 36.4.5.5(2), 37.4.5.3.1(2), 37.4.5.5(2), 42.2.6.3 Exc. No. 2]

NFPA 30B, *Code for the Manufacture and Storage of Aerosol Products*, 1998 edition. [36.4.5.3.1(3), 36.4.5.5(3), 37.4.5.3.1(3), 37.4.5.5(3)]

NFPA 31, *Standard for the Installation of Oil-Burning Equipment*, 1997 edition. (9.2.2)

NFPA 40, *Standard for the Storage and Handling of Cellulose Nitrate Motion Picture Film*, 1997 edition. (12.4.6.1, 12.4.6.3, 13.4.6.1, 13.4.6.3)

NFPA 45, *Standard on Fire Protection for Laboratories Using Chemicals*, 1996 edition. (8.4.4, 9.2.4)

NFPA 54, *National Fuel Gas Code*, 1999 edition. (8.4.3.1, 9.1.1, 9.2.2, 14.5.2.2, 15.5.2.2, 16.5.2.2, 17.5.2.2, 26.5.2.2, 28.5.2.2 Exc., 29.5.2.2 Exc., 30.5.2.2, 31.5.2.2 Exc.)

NFPA 58, *Liquefied Petroleum Gas Code*, 1999 edition. [8.4.3.1, 9.1.1, 11.9.5.1.3, 11.10.7.1.3, 11.11.6.1.3, 12.7.1.4(5), 13.7.1.4(5)]

NFPA 70, *National Electrical Code*[®], 1999 edition. (7.9.2.4, 8.2.5.13, 9.1.2, 9.2.2, 9.6.1.4, 9.6.1.7, 10.2.4.5, 11.8.4.2, 11.8.4.2, 12.4.3.4, 22.5.1.2, 23.5.1.2, 23.5.1.2 Exc.)

NFPA 72, *National Fire Alarm Code*[®], 1999 edition. [7.2.1.8.2(3), 7.2.1.9.2(4), 8.2.4.4.3, 8.3.5.2, 8.3.5.2 Exc. No. 2, 8.3.5.3, 9.6.1.4, 9.6.1.7, 9.6.2.8, 9.6.2.9, 9.6.2.10.1, 9.6.2.10.2, 9.6.3.4, 9.6.3.5, 9.6.3.6, 9.6.3.7 Exc. No. 2, 9.6.3.10, 9.6.4, 9.6.5.4, 9.7.2.1, 11.8.3.2, 14.3.4.2.3(1), 15.3.4.2.3(1), 22.3.4.1.2, 22.3.7.9, 23.3.4.1.2, 23.3.7.9, 32.3.3.4.8]

NFPA 80, *Standard for Fire Doors and Fire Windows*, 1999 edition. [7.2.1.14(5), 8.2.3.2.1(a), 8.2.3.2.2, 8.2.4.3.4, 18.3.6.3.1, 18.3.6.3.6, 19.3.6.3.1, 19.3.6.3.6]

NFPA 82, *Standard on Incinerators and Waste and Linen Handling Systems and Equipment*, 1999 edition. (9.5.2)

NFPA 88A, *Standard for Parking Structures*, 1998 edition. (28.3.5.4, 30.3.5.4)

NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, 1999 edition. (8.2.7.1 Exc. No. 2, 9.2.1)

NFPA 90B, *Standard for the Installation of Warm Air Heating and Air-Conditioning Systems*, 1999 edition. (9.2.1)

NFPA 91, *Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Noncombustible Particulate Solids*, 1999 edition. (9.2.2)

NFPA 96, *Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations*, 1998 edition. (9.2.3)

NFPA 99, *Standard for Health Care Facilities*, 1999 edition. (8.4.4 Exc., 8.4.5, 9.2.4, 18.2.9.2, 18.2.10.2, Table 18.3.2.1, 18.3.2.2, 18.3.2.3, 18.3.2.4, 18.5.1.2, 18.5.1.3, 19.3.2.2, 19.3.2.3, 19.3.2.4, 20.2.9.2, 20.3.2.1, 20.3.2.2, 21.2.9.2, 21.3.2.1, 21.3.2.2)

NFPA 101A, *Guide on Alternative Approaches to Life Safety*, 1998 edition. (33.2.1.3.2 Exc. No. 5, 33.2.3.6.1 Exc. No. 4)

NFPA 110, *Standard for Emergency and Standby Power Systems*, 1999 edition. (7.9.2.3, 9.1.3, 11.8.4.2)

NFPA 111, *Standard on Stored Electrical Energy Emergency and Standby Power Systems*, 1996 edition. (7.9.2.3, 9.1.4)

NFPA 160, *Standard for Flame Effects Before an Audience*, 1998 edition. (12.7.2 Exc. No. 2, 13.7.2 Exc. No. 2)

NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances*, 2000 edition. (9.2.2)

NFPA 220, *Standard on Types of Building Construction*, 1999 edition. (8.2.1, 10.2.3.1 Exc. No. 1, 20.1.6.2, 21.1.6.2)

NFPA 221, *Standard for Fire Walls and Fire Barrier Walls*, 1997 edition. [8.2.1(1), 8.2.2.2]

NFPA 230, *Standard for the Fire Protection of Storage*, 1999 edition. [36.4.5.3.1(4), 36.4.5.5(4), 37.4.5.3.1(4), 37.4.5.5(4)]

NFPA 231D, *Standard for Storage of Rubber Tires*, 1998 edition. [36.4.5.3.1(5), 36.4.5.5(5), 37.4.5.3.1(5), 37.4.5.5(5)]

NFPA 241, *Standard for Safeguarding Construction, Alteration, and Demolition Operations*, 1996 edition. (18.7.9.2, 19.7.9.2, 20.7.9.2, 21.7.9.2)

NFPA 251, *Standard Methods of Tests of Fire Endurance of Building Construction and Materials*, 1999 edition. [3.3.21, 3.3.160, 8.2.3.1.1, 8.2.3.1.1 Exc. No. 2, 12.4.5.7(e)]

NFPA 252, *Standard Methods of Fire Tests of Door Assemblies*, 1999 edition. [3.3.159, 8.2.3.2.1(a), 8.2.3.2.3.1 Exc. No. 1 to (2), 8.2.3.2.3.1 Exc. to (3), 8.3.4.2(1)]

NFPA 253, *Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source*, 2000 edition. (10.2.7.1)

NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials*, 2000 edition. [10.2.3.1, 10.2.3.1 Exc. No. 1, 10.2.3.1 Exc. No. 2, 10.2.3.2, 12.4.5.7(f)]

NFPA 256, *Standard Methods of Fire Tests of Roof Coverings*, 1998 edition. [11.9.1.5, 11.10.1.4, 18.1.6.2 Exc. (a), 19.1.6.2 Exc. (a), 23.1.6.3 Exc. No. 1(a), 32.3.1.3.3 Exc. (a), 33.3.1.3.3 Exc. (a)]

NFPA 257, *Standard on Fire Test for Window and Glass Block Assemblies*, 2000 edition. [3.3.159, 8.2.3.2.2(1)]

NFPA 259, *Standard Test Method for Potential Heat of Building Materials*, 1998 edition (3.3.118)

NFPA 260, *Standard Methods of Tests and Classification System for Cigarette Ignition Resistance of Components of Upholstered Furniture*, 1998 edition. [10.3.2(1)]

NFPA 261, *Standard Method of Test for Determining Resistance of Mock-Up Upholstered Furniture Material Assemblies to Ignition by Smoldering Cigarettes*, 1998 edition. [10.3.2(2)]

NFPA 265, *Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Wall Coverings*, 1998 edition. [10.2.3.5, 10.2.3.5.1, 10.2.3.5.2, 10.2.4.1.5, 10.2.4.2(5)]

NFPA 266, *Standard Method of Test for Fire Characteristics of Upholstered Furniture Exposed to Flaming Ignition Source*, 1998 edition. (10.3.3)

NFPA 267, *Standard Method of Test for Fire Characteristics of Mattresses and Bedding Assemblies Exposed to Flaming Ignition Source*, 1998 edition. (10.3.4)

NFPA 286, *Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth*, 2000 edition. [10.2.3.1 Exc. No. 1, 10.2.3.5, 10.2.3.5.3, 10.2.4.2(6)]

NFPA 418, *Standard for Heliports*, 1995 edition. (18.3.2.7)

NFPA 430, *Code for the Storage of Liquid and Solid Oxidizers*, 2000 edition. [36.4.5.3.1(6), 37.4.5.3.1(6)]

NFPA 432, *Code for the Storage of Organic Peroxide Formulations*, 1997 edition. [36.4.5.3.1(7), 37.4.5.3.1(7)]

NFPA 434, *Code for the Storage of Pesticides*, 1998 edition. [36.4.5.3.1(8), 37.4.5.3.1(8)]

NFPA 701, *Standard Methods of Fire Tests for Flame Propagation of Textiles and Films*, 1999 edition. [10.3.1, 12.4.5.11, 12.7.4.3.4(3), 13.4.5.11, 13.7.4.3.4(3)]

NFPA 703, *Standard for Fire Retardant Impregnated Wood and Fire Retardant Coatings for Building Materials*, 1995 edition. [10.2.6.1, 12.7.4.3.4(2), 13.7.4.3.4(2)]

NFPA 1126, *Standard for the Use of Pyrotechnics before a Proximate Audience*, 1996 edition. (12.7.2 Exc. No. 1, 13.7.2 Exc. No. 1)

2.1.2 Other Publications.

ANSI A14.3-1984, *Safety Code for Fixed Ladders*, American National Standards Institute, 11 West 42nd Street, New York, NY 10036. (7.2.9.2.1)

CABO/ANSI A117.1-1992, *American National Standard for Accessible and Usable Buildings and Facilities*, American National Standards Institute, 11 West 42nd Street, New York, NY 10036. (3.3.14.1, 7.2.12.3.5, 7.10.1.3, 9.6.3.6)

ANSI A1264.1-1989, *Safety Requirements for Workplace Floor and Wall Openings, Stairs and Railing Systems*, American National Standards Institute, 11 West 42nd Street, New York, NY 10036. (7.2.9.2.1 Exc. No. 2, 40.2.2.10)

ANSI/UL 2079, *Test of Fire Resistance of Building Joint Systems*, Underwriters Laboratories Inc., 333 Pfingsten Rd., Northbrook, IL 60062. (8.2.5.2 Exc. No. 3)

ASME/ANSI A17.1-1993, *Safety Code for Elevators and Escalators*, including Addenda A17.1a-1994 and A17.1b-1995, American Society of Mechanical Engineers, Three Park Avenue, New York, NY 10016-5990. (7.2.12.2.4, 7.2.13.9, 7.2.13.11, 9.4.2, 9.4.4, 9.4.8)

ASME/ANSI A17.3-1993, *Safety Code for Existing Elevators and Escalators*, including Addenda A17.3a-1994 and A17.3b-1995, American Society of Mechanical Engineers, Three Park Avenue, New York, NY 10016-5990. (9.4.3, 9.4.5)

ASTM D 2898, *Test Method for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing*, American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959. (12.4.8.3.2, 12.4.8.3.3 Exc., 13.4.8.3.2 Exc., 13.4.8.3.3 Exc.)

ASTM E 136-1982, *Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C*, American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959. (3.3.131)

ASTM E 1537, *Standard Method for Fire Testing of Real Scale Upholstered Furniture Items*, American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959. (10.3.3)

ASTM E 1590-1994, *Standard Method for Fire Testing of Real Scale Mattresses*, American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA. 19428-2959. (10.3.4)

ASTM E 1591-1994, *Standard Guide for Data for Fire Models*, American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959. (5.6.3.1)

ASTM F 851-1983, *Standard Test Method for Self-Rising Seat Mechanisms*, American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA. 19428-2959. (12.2.5.5.1, 13.2.5.5.1)

ASTM G 26, *Practice for Operating Light/Exposure Apparatus (Zenon-Arc Type) With and Without Water for Exposure of Non-Metallic Materials*, American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959. (3.3.211)

BHMA/ANSI A-156.19-1997, *American National Standard for Power Assist and Low Energy Power Operated Doors*, Builders Hardware Manufacturers Association, 355 Lexington Avenue - 17th Floor, New York, NY 10017-6603. [7.2.1.9.2(6)]

Code of Federal Regulations 16, Part 1632. [10.3.2(3)]

UL 924, *Standard for Safety Emergency Lighting and Power Equipment*, Underwriters Laboratories Inc., 333 Pfingsten Rd., Northbrook, IL 60062. (7.10.7.1)

UL 1975, *Standard for Fire Tests for Foamed Plastics Used for Decorative Purposes*, Underwriters Laboratories Inc., 333 Pfingsten Rd., Northbrook, IL 60062. [10.3.7, 12.4.5.11, 12.7.3.3, 12.7.4.3.4(6), 12.7.4.3.4(7), 12.7.4.3.6, 13.7.3.3, 13.7.4.3.4(6), 13.7.4.3.4(7), 13.7.4.3.6]

Webster's Third New International Dictionary of the English Language, Unabridged.

Chapter 3 DEFINITIONS

SECTION 3.1 GENERAL

3.1.1 The following terms, for the purposes of this *Code*, shall have the meanings given in this chapter, if not otherwise modified for a specific occupancy.

3.1.2 Words used in the present tense shall include the future; words used in the masculine gender shall include the feminine and neuter; the singular number shall include the plural, and the plural number shall include the singular.

3.1.3 Where terms are not defined in this chapter or within an occupancy chapter, they shall be defined using their ordinarily accepted meanings within the context in which they are used. *Webster's Third New International Dictionary of the English Language, Unabridged*, shall be a source for ordinarily accepted meaning.

SECTION 3.2 OFFICIAL NFPA DEFINITIONS

3.2.1* **Approved.** Acceptable to the authority having jurisdiction.

3.2.2* **Authority Having Jurisdiction.** The organization, office, or individual responsible 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.

SECTION 3.3 GENERAL DEFINITIONS

3.3.1 **Accessible Area of Refuge.** See 3.3.14.1, *Area of Refuge, Accessible*.

3.3.2 **Accessible Means of Egress.** See 3.3.121.1, *Means of Egress, Accessible*.

3.3.3 **Addition.** An extension or increase in the floor area or height of a building or structure.

3.3.4 **Air-Inflated Structure.** See 3.3.197.1, *Structure, Air-Inflated*.

3.3.5 **Air-Supported Structure.** See 3.3.197.2, *Structure, Air-Supported*.

3.3.6* **Aisle Accessway.** The initial portion of an exit access that leads to an aisle.

3.3.7 **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.

3.3.8 **Ambulatory Health Care Occupancy.** See 3.3.134.1, *Occupancy, Ambulatory Health Care*.

3.3.9 **Analysis, Sensitivity.** 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.

3.3.10 **Analysis, Uncertainty.** An analysis performed to determine the degree to which a predicted value will vary.

3.3.11 **Anchor Store.** A department store or major merchandising center that has direct access to the covered mall but in which all required means of egress is independent of the covered mall.

3.3.12 **Apartment Building.** See 3.3.25.1, *Building, Apartment*.

3.3.13 **Area.** See 3.3.81, *Floor Area, Gross* and 3.3.82, *Floor Area, Net*.

3.3.13.1 **Area, Gross Leasable.** The total floor area designated for tenant occupancy and exclusive use, expressed in square feet (square meters), measured from the centerlines of adjoining partitions and exteriors of outside walls.

3.3.13.2 **Area, Hazardous.** 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, such as areas used for the storage or use of combustibles or flammables; toxic, noxious, or corrosive materials; or heat-producing appliances.

3.3.13.3 **Area, Living.** 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.

3.3.14* **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.

3.3.14.1 **Area of Refuge, Accessible.** An area of refuge that complies with the accessible route requirements of CABO/ANSI A117.1, *American National Standard for Accessible and Usable Buildings and Facilities*.

3.3.15 **Assembly Occupancy.** See 3.3.134.2, *Occupancy, Assembly*.

3.3.16 **Atmosphere, Common.** The atmosphere that exists between rooms, spaces, or areas within a building that are not separated by an approved smoke barrier.

3.3.17 Atmosphere, Separate. The atmosphere that exists between rooms, spaces, or areas that are separated by an approved smoke barrier.

3.3.18* 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; elevator hoistway; escalator opening; or utility shaft used for plumbing, electrical, air-conditioning, or communications facilities.

3.3.19 Automatic. That which provides a function without the necessity of human intervention.

3.3.20* Barrier, Smoke. 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.

3.3.21* Barrier, Thermal. 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 NFPA 251, *Standard Methods of Tests of Fire Endurance of Building Construction and Materials*.

3.3.22* 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.

3.3.23 Bleachers. A grandstand in which the seats are not provided with backrests.

3.3.24 Board and Care. See 3.3.163, *Residential Board and Care Occupancy*.

3.3.25* Building. Any structure used or intended for supporting or sheltering any use or occupancy.

3.3.25.1* Building, Apartment. A building containing three or more dwelling units with independent cooking and bathroom facilities.

3.3.25.2 Building, Bulk Merchandising Retail. 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 (3.7 m) in storage height.

3.3.25.3* Building, Covered Mall. A building, including the covered mall, enclosing a number of tenants and occupancies wherein two or more tenants have a main entrance into the covered mall.

3.3.25.4* Building, Existing. 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.

3.3.25.5* Building, Flexible Plan and Open Plan Educational or Day-Care. A building or portion of a building designed for multiple teaching stations.

3.3.25.6* Building, High-Rise. A building greater than 75 ft (23 m) in height where the building height is measured from the lowest level of fire department vehicle access to the floor of the highest occupiable story.

3.3.25.7* Building, Historic. A structure and its associated additions and site deemed to have historical, architectural, or cultural significance by a local, regional, or national jurisdiction.

3.3.25.8* Building, Special Amusement. A building that is temporary, permanent, or mobile that contains a device or system that conveys passengers or provides a walkway along, around, or over a course in any direction as a form of amusement arranged so that the egress path is not readily apparent due to visual or audio distractions or an intentionally confounded egress path, or is not readily available due to the mode of conveyance through the building or structure.

3.3.26 Bulk Merchandising Retail Building. See 3.3.25.2, *Building, Bulk Merchandising Retail*.

3.3.27 Business Occupancy. See 3.3.134.3, *Occupancy, Business*.

3.3.28 Cellular or Foamed Plastic. See 3.3.148, *Plastic, Cellular or Foamed*.

3.3.29 Combustible. 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.

3.3.30 Combustion. A chemical process that involves oxidation sufficient to produce light or heat.

3.3.31 Common Atmosphere. See 3.3.16, *Atmosphere, Common*.

3.3.32* 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.

3.3.33 Contents and Furnishings. Objects, goods, or products placed inside a structure for functional, operational, or decorative reasons, excluding parts of the building structure, building service equipment, and items meeting the definition of interior finish.

3.3.34 Court. An open, uncovered, unoccupied space, unobstructed to the sky, bounded on three or more sides by exterior building walls.

3.3.34.1 Court, Enclosed. 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.

3.3.35 Covered Mall. A covered or roofed interior area used as a pedestrian way and connected to a building(s) or portions of a building housing single or multiple tenants.

3.3.36 Covered Mall Building. See 3.3.25.3, *Building, Covered Mall*.

3.3.37* Critical Radiant Flux. The level of incident radiant heat energy on a floor-covering system at the most distant flameout point.

3.3.38 Data Conversion. The process of developing the input data set for the assessment method of choice.

3.3.39* Day-Care Home. A building or portion of a building in which more than three 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.

3.3.40 Day-Care Occupancy. See 3.3.134.4, *Occupancy Day-Care*.

3.3.41 Design Fire Scenario. See 3.3.76.1, *Fire Scenario, Design*.

3.3.42* Design Specifications. Building characteristics and other conditions that are under the control of the design team.

3.3.43 Design Team. A group of stakeholders including, but not limited to, representatives of the architect, client, and any pertinent engineers and other designers.

3.3.44 Detention and Correctional Occupancy. See 3.3.134.5, *Occupancy, Detention and Correctional*.

3.3.45 Detention and Correctional Residential Housing Area. See 3.3.165, *Residential Housing Area, Detention and Correctional*.

3.3.46* 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.

3.3.47 Draft Stop. A continuous membrane used to subdivide a concealed space to restrict the passage of smoke, heat, and flames.

3.3.48 Dwelling Unit. A single unit, providing complete, independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking, and sanitation.

3.3.49 Educational Occupancy. See 3.3.134.6, *Occupancy, Educational*.

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

3.3.51 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.

3.3.52 Elevator Lobby. A space from which people directly enter an elevator car(s) and to which people directly leave an elevator car(s).

3.3.53 Elevator Lobby Door. A door between an elevator lobby and another building space other than the elevator shaft.

3.3.54 Emergency Access Opening. A window, panel, or similar opening in which (1) the opening has dimensions of not less than 22 in. (55.9 cm) in width and 24 in. (61 cm) in height and is unobstructed to allow for ventilation and rescue operations from the exterior, (2) the bottom of the opening is not more than 44 in. (112 cm) above the floor, (3) the opening is readily identifiable from both the exterior and interior, and (4) the opening is readily openable from both the exterior and interior.

3.3.55 Enclosed Court. See 3.3.34.1, *Court, Enclosed*.

3.3.56* 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.

3.3.56.1 Evacuation Capability, Impractical. The inability of a group to reliably move to a point of safety in a timely manner.

3.3.56.2 Evacuation Capability, Prompt. 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.

3.3.56.3 Evacuation Capability, Slow. 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.

3.3.57 Exhibit. A space or portable structure used for the display of products or services.

3.3.58 Exhibitor. An individual or entity engaged in the display of the products or services offered.

3.3.59* Existing. That which is already in existence on the date this edition of the *Code* goes into effect.

3.3.60 Existing Building. See 3.3.25.4, *Building, Existing*.

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

3.3.61.1* Exit, Horizontal. 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.

3.3.62 Exit Access. That portion of a means of egress that leads to an exit.

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

3.3.63.1 Exit Discharge, Level of. (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 grade; (2) the story with the smallest elevation change needed to reach grade where no story has 50 percent or more of the required number of exits and 50 percent or more of the required egress capacity from such a story discharge directly outside at grade.

3.3.64 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.

3.3.65 Exposition Facility. A convention center, hotel, or other building at which exposition events are held.

3.3.66* 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.

3.3.67 Externally Illuminated. See 3.3.106, *Illuminated, Externally*.

3.3.68 Festival Seating. See 3.3.171, *Seating, Festival*.

3.3.69* 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 and that also restricts the movement of smoke.

3.3.70 Fire Barrier Wall. See 3.3.208, *Wall, Fire Barrier*.

- 3.3.71* Fire Compartment.** A space within a building that is enclosed by fire barriers on all sides, including the top and bottom.
- 3.3.72 Fire Exit Hardware.** A door-latching assembly incorporating a device that releases the latch upon the application of a force in the direction of egress travel and provides fire protection where used as part of a fire door assembly.
- 3.3.73* Fire Model.** A structured approach to predicting one or more effects of a fire.
- 3.3.74 Fire Protection Rating.** See 3.3.159, *Rating, Fire Protection*.
- 3.3.75 Fire Resistance Rating.** See 3.3.160, *Rating, Fire Resistance*.
- 3.3.76* 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.
- 3.3.76.1 Fire Scenario, Design.** A fire scenario used for evaluation of a proposed design.
- 3.3.77* Fire Watch.** A person or persons assigned to an area for the purpose of protecting the occupants from fire or similar emergencies.
- 3.3.78* Flame Spread.** The propagation of flame over a surface.
- 3.3.79* Flashover.** A stage in the development of a contained fire in which all exposed surfaces reach ignition temperatures more or less simultaneously and fire spreads rapidly throughout the space.
- 3.3.80 Flexible Plan and Open Plan Educational or Day-Care Building.** See 3.3.25.5, *Building, Flexible Plan and Open Plan Educational or Day-Care*.
- 3.3.81* Floor Area, Gross.** The floor area within the inside perimeter of the outside walls of the building under consideration with no deduction for hallways, stairs, closets, thickness of interior walls, columns, or other features.
- 3.3.82 Floor Area, Net.** The floor area that is the actual occupied area, not including accessory unoccupied areas or thickness of walls.
- 3.3.83 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.
- 3.3.84 Fly Gallery.** A raised floor area above a stage from which the movement of scenery and operation of other stage effects are controlled.
- 3.3.85 Folding and Telescopic Seating.** See 3.3.172, *Seating, Folding and Telescopic*.
- 3.3.86* Fuel Load.** The total quantity of combustible contents of a building, space, or fire area.
- 3.3.87 General Industrial Occupancy.** See 3.3.134.8.1, *Occupancy, Industrial, General*.
- 3.3.88 Goal.** A nonspecific overall outcome to be achieved that is measured on a qualitative basis.
- 3.3.89* Grandstand.** A structure that provides tiered or stepped seating.
- 3.3.90 Gridiron.** The structural framing over a stage supporting equipment for hanging or flying scenery and other stage effects.
- 3.3.91 Gross Floor Area.** See 3.3.81, *Floor Area, Gross*.
- 3.3.92 Gross Leasable Area.** See 3.3.13.1, *Area, Gross Leasable*.
- 3.3.93 Guard.** A vertical protective barrier erected along exposed edges of stairways, balconies, and similar areas.
- 3.3.94 Guest Room.** An accommodation combining living, sleeping, sanitary, and storage facilities within a compartment.
- 3.3.95 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.
- 3.3.96 Handrail.** A bar, pipe, or similar member designed to furnish persons with a handhold.
- 3.3.97 Hazardous Area.** See 3.3.13.2, *Area, Hazardous*.
- 3.3.98 Health Care Occupancy.** See 3.3.134.7, *Occupancy, Health Care*.
- 3.3.99* Heat Release Rate (HRR).** The rate at which heat energy is generated by burning.
- 3.3.100 High Hazard Industrial Occupancy.** See 3.3.134.8.2, *Occupancy, Industrial, High Hazard*.
- 3.3.101 High-Rise Building.** See 3.3.25.6, *Building, High-Rise*.
- 3.3.102 Historic Building.** See 3.3.25.7, *Building, Historic*.
- 3.3.103 Horizontal Exit.** See 3.3.61.1, *Exit, Horizontal*.
- 3.3.104 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.
- 3.3.105* 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.
- 3.3.106* Illuminated, Externally.** Refers to an illumination source that is contained outside of the device or sign legend area that is to be illuminated.
- 3.3.107* Illuminated, Internally.** Refers to an illumination source that is contained inside the device or legend that is illuminated.
- 3.3.108 Impractical Evacuation Capability.** See 3.3.56.1, *Evacuation Capability, Impractical*.
- 3.3.109 Incapacitation.** A condition under which humans do not function adequately and become unable to escape untenable conditions.
- 3.3.110 Industrial Occupancy.** See 3.3.134.8, *Occupancy, Industrial*.
- 3.3.111 Input Data Specification.** Information required by the verification method.
- 3.3.112* Interior Finish.** The exposed surfaces of walls, ceilings, and floors within buildings.
- 3.3.112.1 Interior Ceiling Finish.** The interior finish of ceilings.

3.3.112.2* Interior Floor Finish. The interior finish of floors, ramps, stair treads and risers, and other walking surfaces.

3.3.112.3 Interior Wall Finish. The interior finish of columns, fixed or movable walls, and fixed or movable partitions.

3.3.113 Internally Illuminated. See 3.3.107, *Illuminated, Internally*.

3.3.114 Legitimate Stage. See 3.3.191.1, *Stage, Legitimate*.

3.3.115 Level of Exit Discharge. See 3.3.63.1, *Exit Discharge, Level of*.

3.3.116 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.

3.3.117* 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 limitations due to accident or illness; or limitations such as mental retardation/developmental disability, mental illness, or chemical dependency.

3.3.118* Limited-Combustible. Refers to a building construction material not complying with the definition of *non-combustible* (see 3.3.131) that, in the form in which it is used, has a potential heat value not exceeding 3500 Btu/lb (8141 kJ/kg), where tested in accordance with NFPA 259, *Standard Test Method for Potential Heat of Building Materials*, and includes (1) materials having a structural base of noncombustible material, with a surfacing not exceeding a thickness of $\frac{1}{8}$ in. (3.2 mm) that has a flame spread index not greater than 50; and (2) materials, in the form and thickness used, other than as described in (1), having neither a flame spread index greater than 25 nor evidence of continued progressive combustion, and of such composition that surfaces that would be exposed by cutting through the material on any plane would have neither a flame spread index greater than 25 nor evidence of continued progressive combustion.

3.3.119 Living Area. See 3.3.13.3, *Area, Living*.

3.3.120 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.

3.3.121* 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.

3.3.121.1 Means of Egress, Accessible. A path of travel, usable by a person with a severe mobility impairment, that leads to a public way or an area of refuge.

3.3.122 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.

3.3.123 Membrane. A thin, flexible, water-impervious material capable of being supported by an air pressure of 1.5 in. (38.1 mm) water column.

3.3.124 Membrane Structure. See 3.3.197.3, *Structure, Membrane*.

3.3.125 Mercantile Occupancy. See 3.3.134.9, *Occupancy, Mercantile*.

3.3.126 Mezzanine. An intermediate level between the floor and the ceiling of any room or space.

3.3.127 Mixed Occupancy. See 3.3.134.10, *Occupancy, Mixed*.

3.3.128 Multilevel Play Structure. See 3.3.197.4, *Structure, Multilevel Play*.

3.3.129 Multipurpose Assembly Occupancy. See 3.3.134.11, *Occupancy, Multipurpose Assembly*.

3.3.130 Net Floor Area. See 3.3.82, *Floor Area, Net*.

3.3.131 Noncombustible. Refers to a material that, in the form in which it is used and under the conditions anticipated, does not ignite, burn, support combustion, or release flammable vapors, when subjected to fire or heat. Materials that are reported as passing ASTM E 136, *Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C*, are considered noncombustible materials.

3.3.132 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.

3.3.133* Objective. A requirement that needs to be met to achieve a goal.

3.3.134 Occupancy. The purpose for which a building or portion thereof is used or intended to be used.

3.3.134.1 Occupancy, Ambulatory Health Care. A building or portion thereof used to provide services or treatment simultaneously to four or more patients that (1) provides, on an outpatient basis, treatment for patients that renders the patients incapable of taking action for self-preservation under emergency conditions without the assistance of others; or (2) provides, on an outpatient basis, anesthesia that renders the patients incapable of taking action for self-preservation under emergency conditions without the assistance of others.

3.3.134.2* Occupancy, Assembly. 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.

3.3.134.3* Occupancy, Business. An occupancy used for account and record keeping or the transaction of business other than mercantile.

3.3.134.4* Occupancy, Day-Care. 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.

3.3.134.5* Occupancy, Detention and Correctional. An occupancy used to house four 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.

3.3.134.6* Occupancy, Educational. An occupancy used for educational purposes through the twelfth grade by six or more persons for four or more hours per day or more than 12 hours per week.

3.3.134.7* Occupancy, Health Care. An occupancy used for purposes of medical or other treatment or care of four or more persons where such occupants are mostly incapable of

self-preservation due to age, physical or mental disability, or because of security measures not under the occupants' control.

3.3.134.8* Occupancy, Industrial. An occupancy in which products are manufactured or in which processing, assembling, mixing, packaging, finishing, decorating, or repair operations are conducted.

3.3.134.8.1* Occupancy, Industrial, General. 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.

3.3.134.8.2* Occupancy, Industrial, High Hazard. An industrial occupancy in which industrial operations that include high hazard materials, processes, or contents are conducted.

3.3.134.8.3 Occupancy, Industrial, Special Purpose. 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.

3.3.134.9* Occupancy, Mercantile. An occupancy used for the display and sale of merchandise.

3.3.134.10* Occupancy, Mixed. An occupancy in which two or more classes of occupancy exist in the same building or structure and where such classes are intermingled so that separate safeguards are impracticable.

3.3.134.11 Occupancy, Multipurpose Assembly. An assembly room designed to accommodate temporarily any of several possible assembly uses.

3.3.134.12* Occupancy, Residential. An occupancy that provides sleeping accommodations for purposes other than health care or detention and correctional.

3.3.134.13* Occupancy, Residential Board and Care. A building or portion thereof that is 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.

3.3.134.14* Occupancy, Storage. An occupancy used primarily for the storage or sheltering of goods, merchandise, products, vehicles, or animals.

3.3.135 Occupant Characteristics. The abilities or behaviors of people before and during a fire.

3.3.136 Occupant Load. The total number of persons that might occupy a building or portion thereof at any one time.

3.3.137 Occupiable Story. See 3.3.194.1, *Story, Occupiable*.

3.3.138 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.

3.3.139 Open-Air Parking Structure. See 3.3.197.6, *Structure, Open-Air Parking*.

3.3.140 Open Structure. See 3.3.197.5, *Structure, Open*.

3.3.141* Outside Stair. A stair with not less than one side open to the outer air.

3.3.142 Panic Hardware. A door-latching assembly incorporating a device that releases the latch upon the application of a force in the direction of egress travel.

3.3.143* Performance Criteria. Threshold values on measurement scales that are based on quantified performance objectives.

3.3.144 Permanent Structure. See 3.3.197.7, *Structure, Permanent*.

3.3.145* Personal Care. The care of residents who do not require chronic or convalescent medical or nursing care.

3.3.146* Photoluminescent. Having the property of emitting light that continues for a length of time after excitation by visible or invisible light has been removed.

3.3.147 Pinrail. A rail on or above a stage through which belaying pins are inserted and to which lines are fastened.

3.3.148* Plastic, Cellular or Foamed. 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.

3.3.149* Platform. The raised area within a building used for the presentation of music, plays, or other entertainment.

3.3.149.1 Platform, Temporary. A platform erected within an area for not more than 30 days.

3.3.150 Plenum. A compartment or chamber to which one or more air ducts are connected and that forms part of the air distribution system.

3.3.151 Point of Safety. A location that (a) is exterior to and away from a building; or (b) is within a building of any type construction 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 8.3, with not less than a 1/2-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) 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 8.3, with not less than a 1/2-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.

3.3.152 Private Party Tent. See 3.3.201.1, *Tent, Private Party*.

3.3.153 Professional Engineer. An engineer who is registered or licensed to practice engineering.

3.3.154 Prompt Evacuation Capability. See 3.3.56.2, *Evacuation Capability, Prompt*.

3.3.155* Proposed Design. A design developed by a design team and submitted to the authority having jurisdiction for approval.

3.3.156 Proscenium Wall. See 3.3.209, *Wall, Proscenium*.

3.3.157 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 (3 m).

3.3.158* Ramp. A walking surface that has a slope steeper than 1 in 20.

3.3.159 Rating, Fire Protection. The designation indicating the duration of the fire test exposure to which a fire door assembly or fire window assembly was exposed and for which it met all the acceptance criteria as determined in accordance with NFPA 252, *Standard Methods of Fire Tests of Door Assemblies*, or NFPA 257, *Standard on Fire Test for Window and Glass Block Assemblies*, respectively.

3.3.160 Rating, Fire Resistance. The time, in minutes or hours, that materials or assemblies have withstood a fire exposure as established in accordance with the test procedures of NFPA 251, *Standard Methods of Tests of Fire Endurance of Building Construction and Materials*.

3.3.161 Regular Stage. See 3.3.191.2, *Stage, Regular*.

3.3.162 Resident, Residential Board and Care. A person who receives personal care and resides in a residential board and care facility.

3.3.163 Residential Board and Care Occupancy. See 3.3.134.13, *Occupancy, Residential Board and Care*.

3.3.164 Residential Board and Care Resident. See 3.3.162, *Resident, Residential Board and Care*.

3.3.165 Residential Housing Area, Detention and Correctional. Sleeping areas and any contiguous day room, group activity space, or other common space for customary access of residents.

3.3.166 Residential Occupancy. See 3.3.134.12, *Occupancy, Residential*.

3.3.167 Safe Location. A location remote or separated from the effects of a fire so that such effects no longer pose a threat.

3.3.168 Safety Factor. A factor applied to a predicted value to ensure that a sufficient safety margin is maintained.

3.3.169 Safety Margin. The difference between a predicted value and the actual value where a fault condition is expected.

3.3.170 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.

3.3.171* Seating, Festival. A form of audience/spectator accommodation in which no seating, other than a floor or ground surface, is provided for the audience/spectators gathered to observe a performance.

3.3.172 Seating, Folding and Telescopic. 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.

3.3.173 Seating, Smoke-Protected Assembly. Seating served by means of egress that is not subject to smoke accumulation within or under the structure.

3.3.174 Self-Closing. Equipped with an approved device that ensures closing after opening.

3.3.175* Self-Luminous. Illuminated by a self-contained power source and operated independently of external power sources.

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

3.3.177 Sensitivity Analysis. See 3.3.9, *Analysis, Sensitivity*.

3.3.178 Separate Atmosphere. See 3.3.17, *Atmosphere, Separate*.

3.3.179 Severe Mobility Impairment. The ability to move to stairs but without the ability to use the stairs.

3.3.180 Slow Evacuation Capability. See 3.3.56.3, *Evacuation Capability, Slow*.

3.3.181 Smoke Alarm. A single- or multiple-station alarm that responds to smoke.

3.3.182 Smoke Barrier. See 3.3.20, *Barrier, Smoke*.

3.3.183* Smoke Compartment. A space within a building enclosed by smoke barriers on all sides, including the top and bottom.

3.3.184 Smoke Detector. A device that detects visible or invisible particles of combustion.

3.3.185* Smoke Partition. A continuous membrane that is designed to form a barrier to limit the transfer of smoke.

3.3.186* Smokeproof Enclosure. A stair enclosure designed to limit the movement of products of combustion produced by a fire.

3.3.187 Smoke-Protected Assembly Seating. See 3.3.173, *Seating, Smoke-Protected Assembly*.

3.3.188 Special Amusement Building. See 3.3.25.8, *Building, Special Amusement*.

3.3.189 Special Purpose Industrial Occupancy. See 3.3.134.8.3, *Occupancy, Industrial, Special Purpose*.

3.3.190 Staff (Residential Board and Care). Persons who provide personal care services, supervision, or assistance.

3.3.191 Stage. A space within a building used for entertainment and utilizing drops or scenery or other stage effects.

3.3.191.1 Stage, Legitimate. 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.

3.3.191.2 Stage, Regular. A stage with a height of 50 ft (15 m) or less measured from the lowest point on the deck above.

3.3.192 Stakeholder. An individual, or representative of same, having an interest in the successful completion of a project.

3.3.193 Storage Occupancy. See 3.3.134.14, *Occupancy, Storage*.

3.3.194 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.

3.3.194.1* Story, Occupiable. A story occupied by people on a regular basis.

3.3.195 Street. A public thoroughfare that has been dedicated for vehicular use by the public and can be used for access by fire department vehicles.

3.3.196* Street Floor. A story or floor level accessible from the street or from outside a building at ground level, with the floor level at the main entrance located not more than three risers above or below ground level and arranged and utilized to qualify as the main floor.

3.3.197* Structure. That which is built or constructed.

3.3.197.1 Structure, Air-Inflated. 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.

3.3.197.2* Structure, Air-Supported. A structure whose shape is maintained by air pressure and in which occupants are within the elevated pressure area.

3.3.197.3 Structure, Membrane. 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.

3.3.197.4 Structure, Multilevel Play. 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.

3.3.197.5* Structure, Open. A structure that supports equipment and operations not enclosed within building walls.

3.3.197.6 Structure, Open-Air Parking. A structure used for the parking or storage of motor vehicles that have (1) uniformly distributed openings in exterior walls on not less than two sides totaling not less than 40 percent of the building perimeter, (2) aggregate areas of such openings in exterior walls in each level not less than 20 percent of the total perimeter wall area of each level, and (3) interior wall lines and columns not less than 20 percent open with openings distributed to allow ventilation.

3.3.197.7 Structure, Permanent. A building or structure that is intended to remain in place for a period of more than 180 consecutive days.

3.3.197.8 Structure, Temporary. A building or structure not meeting the definition of *permanent structure*. (See 3.3.197.7.)

3.3.197.9 Structure, Tensioned-Membrane. 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.

3.3.197.10* Structure, Underground. A structure or portions of a structure in which the floor level is below the level of exit discharge.

3.3.197.11 Structure, Water-Surrounded. A structure fully surrounded by water.

3.3.197.12 Structure, Windowless. A structure or portions of a structure lacking access openings.

3.3.198 Temporary Platform. See 3.3.149.1, *Platform, Temporary*.

3.3.199 Temporary Structure. See 3.3.197.8, *Structure, Temporary*.

3.3.200 Tensioned-Membrane Structure. See 3.3.197.9, *Structure, Tensioned-Membrane*.

3.3.201* 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.

3.3.201.1 Tent, Private Party. A tent erected in the yard of a private residence for entertainment, recreation, dining, a reception, or similar function.

3.3.202 Thermal Barrier. See 3.3.21, *Barrier, Thermal*.

3.3.203 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 where (1) the elevated levels are provided to allow adequate observation or line-of-sight for personnel or equipment, and (2) the levels within the tower below the observation level and equipment room for that level are not occupied.

3.3.204 Uncertainty Analysis. See 3.3.10, *Analysis, Uncertainty*.

3.3.205 Underground Structure. See 3.3.197.10, *Structure, Underground*.

3.3.206 Verification Method. A procedure or process used to demonstrate or confirm that the proposed design meets the specified criteria.

3.3.207 Vertical Opening. An opening through a floor or roof.

3.3.208 Wall, Fire Barrier. A wall, other than a fire wall, that has a fire resistance rating.

3.3.209 Wall, Proscenium. The wall that separates the stage from the auditorium or house.

3.3.210 Water-Surrounded Structure. See 3.3.197.11, *Structure, Water-Surrounded*.

3.3.211 Weathered-Membrane Material. Membrane material that has been subjected to not less than 3000 hours in a weatherometer in accordance with ASTM G 26, *Practice for Operating Light/Exposure Apparatus (Zenon-Arc Type) With and Without Water for Exposure of Non-Metallic Materials*, or approved equivalent.

3.3.212 Windowless Structure. See 3.3.197.12, *Structure, Windowless*.

3.3.213 Yard. An open, unoccupied space other than a court, unobstructed from the ground to the sky on the lot on which a building is situated.

Chapter 4 GENERAL

SECTION 4.1* GOALS

4.1.1* Fire and Similar Emergency. The goal of this *Code* is to provide an environment for the occupants that is reasonably safe from fire and similar emergencies 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* Crowd Movement. An additional goal is to provide for reasonably safe emergency crowd movement and, where required, reasonably safe nonemergency crowd movement.

SECTION 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 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.

SECTION 4.3 ASSUMPTION

4.3.1* Single Fire Source. The protection methods of this *Code* assume a single fire source.

SECTION 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) The prescriptive-based provisions per 4.4.2
- (2) The 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, and the applicable occupancy Chapters 12 through 42 of this *Code*.

4.4.2.2 Where specific requirements contained in Chapters 11 through 42 differ from general requirements contained in Chapters 1 through 4, and Chapters 6 through 10, the requirements of Chapters 11 through 42 shall govern.

4.4.3 Performance-Based Option. A performance-based life safety design shall be in accordance with Chapters 1, 2, and 3, Sections 4.1 through 4.4, 4.6.9.2, and Chapter 5 of this *Code*.

SECTION 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 ineffective due to inappropriate human actions or system failure.

4.5.2 Appropriateness of Safeguards. Every building or structure shall be provided with means of egress and other 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
- (2) Capabilities of the occupants
- (3) Number of persons exposed
- (4) Fire protection available
- (5) Height and type of construction of the building or structure
- (6) 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. No lock or fastening shall be permitted that prevents free escape from the inside of any building other than in health care occupancies and detention and correctional occupancies where staff are continually on duty and effective provisions are made to remove occupants in case of fire or other emergency. 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 facilities shall be provided where necessary to warn occupants of the existence of fire.

4.5.5 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 spread of fire, smoke, or fumes through vertical openings from floor to floor before occupants have entered exits.

4.5.6 System Design/Installation. Any fire protection system, building service equipment, feature of protection, or safeguard provided for life safety shall be designed, installed, and approved in accordance with applicable NFPA standards.

4.5.7 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 maintained unless the *Code* exempts such maintenance.

SECTION 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 its application would be hazardous under normal occupancy conditions in the judgment of the authority having jurisdiction.

4.6.2* Historic Buildings. 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.

4.6.3* 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.

4.6.4 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.

4.6.5 Referenced Publications. Existing buildings or installations that do not comply with the provisions of the referenced standards contained in this document (*see Chapter 2*) shall be permitted to be continued in service, provided that the lack of conformity with these standards does not present a serious hazard to the occupants as determined by the authority having jurisdiction.

4.6.6 Additions. Additions shall conform to the provisions for new construction.

4.6.7* Modernization or Renovation. Any alteration or any installation of new equipment shall meet, as nearly as practicable, the requirements for new construction. Only the altered, renovated, or modernized portion of an existing building, system, or individual component shall be required to meet the provisions of this *Code* that are applicable to new construction. If the alteration, renovation, or modernization adversely impacts required life safety features, additional upgrading shall be required. 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. In no case shall the resulting life safety features be less than those required for existing buildings.

4.6.8 Provisions in Excess of Code Requirements. Nothing in this *Code* shall be construed to prohibit a better type of building construction, 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 they 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* 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.

4.6.10.3 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* Changes of Occupancy. In any building or structure, whether or not a physical alteration is needed, a change from one occupancy classification to another shall be permitted only where such a structure, building, or portion thereof conforms with the requirements of this *Code* that apply to new construction for the proposed new use or, where specifically permitted elsewhere in the *Code*, existing construction features shall be permitted to be continued in use in conversions.

4.6.12 Maintenance and Testing.

4.6.12.1 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 continuously maintained in accordance with applicable NFPA requirements or as directed by the authority having jurisdiction.

4.6.12.2* Existing life safety features obvious to the public, if not required by the *Code*, shall be either maintained or removed.

4.6.12.3 Equipment requiring periodic testing or operation to ensure its maintenance shall be tested or operated as specified elsewhere in this *Code* or as directed by the authority having jurisdiction.

4.6.12.4 Maintenance and testing shall be under the supervision of a responsible person who shall ensure that testing and maintenance are made at specified intervals in accordance with applicable NFPA standards or as directed by the authority having jurisdiction.

SECTION 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 42, 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 42 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 Competency. Responsibility for the planning and conduct of drills shall be assigned only to competent persons qualified to exercise leadership.

4.7.4 Orderly Evacuation. In the conduct of drills, emphasis shall be placed on orderly evacuation rather than on speed.

4.7.5* 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.

4.7.6 Relocation Area. Drill participants shall relocate to a predetermined location and remain at such location until a recall or dismissal signal is given.

Chapter 5 PERFORMANCE-BASED OPTION

SECTION 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 4.4.3.

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* Approved Qualifications. The performance-based design shall be prepared by a person with qualifications acceptable to the authority having jurisdiction. (*See also 5.8.12.*)

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 Special Definitions. A list of special terms used in this chapter follows:

Alternative Calculation Procedure. See 3.3.7.

Data Conversion. See 3.3.38.

Design Fire Scenario. See 3.3.41.

Design Specifications. See 3.3.42.

Design Team. See 3.3.43.

Exposure Fire. See 3.3.66.

Fire Model. See 3.3.73.

Fire Scenario. See 3.3.76.

Fuel Load. See 3.3.86.

Incapacitation. See 3.3.109.

Input Data Specification. See 3.3.111.

Occupant Characteristics. See 3.3.135.

Performance Criteria. See 3.3.143.

Proposed Design. See 3.3.155.

Safe Location. See 3.3.167.

Safety Factor. See 3.3.168.

Safety Margin. See 3.3.169.

Sensitivity Analysis. See 3.3.177.

Stakeholder. See 3.3.192.

Uncertainty Analysis. See 3.3.204.

Verification Method. See 3.3.206.

SECTION 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. No occupant who is not intimate with ignition shall be exposed to instantaneous or cumulative untenable conditions.

SECTION 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

Exception: 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 shall be exempted.

- (5) Ramps — 7.2.5

Exception: The provisions of 7.2.5.3.1, 7.2.5.5, and 7.2.5.6.1 shall be exempted.

- (6) Fire Escape Ladders — 7.2.9
- (7) Alternating Tread Devices — 7.2.11
- (8) Capacity of Means of Egress — 7.3

Exception: The provisions of 7.3.3 and 7.3.4 shall be exempted.

- (9) Impediments to Egress — 7.5.2
- (10) Illumination of Means of Egress — 7.8
- (11) Emergency Lighting — 7.9
- (12) Marking of Means of Egress — 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 1.5.

SECTION 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 calculation 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 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 and building features shall reflect the documented performance 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 estimates shall reflect 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 certain maximum, operational controls shall be used to ensure that a greater number of people could not occupy a room.

5.4.5.5* Staff Assistance. The ability of trained employees to be included 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 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 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.

SECTION 5.5* DESIGN FIRE SCENARIOS

5.5.1 Design Fire Scenarios. 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 challenging, but 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

The scenario specifications shall be as challenging as any that could realistically occur in the building.

5.5.3* Required Design Fire Scenarios. 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.

Exception: 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 is an occupancy-specific design fire scenario representative of a typical fire for the occupancy. This design fire scenario shall explicitly account for the following:

- (1) Occupant activities
- (2) Number and location
- (3) Room size
- (4) Furnishings and contents
- (5) Fuel properties and ignition sources
- (6) Ventilation conditions

The first item ignited and its location shall be explicitly defined.

5.5.3.2* Design Fire Scenario 2. Design fire scenario 2 is an ultrafast-developing fire, in the primary means of egress, with interior doors open at the start of the fire. This design fire scenario shall address 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 is a fire that starts in a normally unoccupied room that can potentially endanger a large number of occupants in a large room or other area. This design fire scenario shall address the concern regarding a fire starting in a normally unoccupied room and migrating into the space that can, potentially, hold the greatest number of occupants in the building.

5.5.3.4* Design Fire Scenario 4. Design fire scenario 4 is a fire that originates in a concealed wall- or ceiling-space adjacent to a large occupied room. This design fire scenario shall

address the concern regarding a fire originating in a concealed space that does not have either a detection system or suppression system and then spreading into the room within the building that can, potentially, hold the greatest number of occupants.

5.5.3.5* Design Fire Scenario 5. Design fire scenario 5 is a slowly developing fire, shielded from fire protection systems, in close proximity to a high occupancy area. This design fire scenario shall address the concern regarding a relatively small ignition source causing a significant fire.

5.5.3.6* Design Fire Scenario 6. Design fire scenario 6 is the most severe fire resulting from the largest possible fuel load characteristic of the normal operation of the building. This design fire scenario shall address the concern regarding a rapidly developing fire with occupants present.

5.5.3.7* Design Fire Scenario 7. Design fire scenario 7 is an outside exposure fire. This design fire scenario shall address 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 is a fire originating in ordinary combustibles in a room or area with each passive or active fire protection system independently rendered ineffective. This set of design fire scenarios shall address concern regarding each fire protection system or fire protection feature, considered individually, being unreliable or becoming unavailable.

Exception: This scenario shall not be 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.

SECTION 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 E 1591, *Standard Guide for Data for Fire 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.

SECTION 5.7 SAFETY FACTORS

5.7.1* General. 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.

SECTION 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, data bases,

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) The building was approved as a performance-based design with certain specified design criteria and assumptions.
- (2) Any remodeling, modification, renovation, change in use, or change in the established assumptions will require a re-evaluation and reapproval.

Chapter 6 CLASSIFICATION OF OCCUPANCY AND HAZARD OF CONTENTS

SECTION 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 Chapters 12 through 42, 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 Small Assembly Uses. Occupancy of any room or space for assembly purposes by fewer than 50 persons in an other occupancy and incidental to such other occupancy shall be classified as part of the other occupancy and shall be subject to the provisions applicable thereto.

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 four 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.

6.1.5 Health Care. For requirements, see Chapters 18 and 19.

6.1.5.1* Definition — Health Care Occupancy. An occupancy used for purposes of medical or other treatment or care of four or more persons where such occupants are mostly incapable of self-preservation due to age, physical or mental disability, or because of security measures not under the occupants' control.

6.1.6 Ambulatory Health Care. For requirements, see Chapters 20 and 21.

6.1.6.1 Definition — Ambulatory Health Care Occupancy. A building or portion thereof used to provide services or treatment simultaneously to four or more patients that (1) provides, on an outpatient basis, treatment for patients that renders the patients incapable of taking action for self-preservation under emergency conditions without the assistance of

others, or (2) provides, on an outpatient basis, anesthesia that renders the patients incapable of taking action for self-preservation under emergency conditions without the assistance of others.

6.1.7 Detention and Correctional. For requirements, see Chapters 22 and 23.

6.1.7.1* Definition — Detention and Correctional Occupancy. An occupancy used to house four 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 22.1.2.1 and 23.1.2.1.)

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.

6.1.9 Residential Board and Care. For requirements, see Chapters 32 and 33.

6.1.9.1* Definition — Residential Board and Care Occupancy. A building or portion thereof that is 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.

6.1.10 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.

6.1.11 Business. For requirements, see Chapters 38 and 39.

6.1.11.1* Definition — Business Occupancy. An occupancy used for account and record keeping or the transaction of business other than mercantile.

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.

6.1.13 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, vehicles, or animals.

6.1.14 Mixed Occupancies.

6.1.14.1* Definition — Mixed Occupancy. An occupancy in which two or more classes of occupancy exist in the same building or structure and where such classes are intermingled so that separate safeguards are impracticable.

6.1.14.2 Applicable Requirements. Where a mixed occupancy classification occurs, the means of egress facilities, construction, protection, and other safeguards shall comply with the most restrictive life safety requirements of the occupancies involved.

*Exception:** Where incidental to another occupancy, buildings used as follows shall be permitted to be considered part of the predominant

occupancy and subject to the provisions of the Code that apply to the predominant occupancy:

(a) Mercantile, business, industrial, or storage use

(b) Nonresidential use with an occupant load fewer than that established by Section 6.1 for the occupancy threshold

SECTION 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 determined by the authority having jurisdiction 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 8.4 and the applicable sections of Chapters 11 through 42.

6.2.2 Classification of Hazard of Contents.

6.2.2.1* 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. 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. 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. 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.)

Chapter 7 MEANS OF EGRESS

SECTION 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.

Accessible Area of Refuge. See 3.3.1.

Accessible Means of Egress. See 3.3.2.

Area of Refuge. See 3.3.14.

Common Path of Travel. See 3.3.32.

Electroluminescent. See 3.3.50.

Elevator Evacuation System. See 3.3.51.

Elevator Lobby. See 3.3.52.

Elevator Lobby Door. See 3.3.53.

Exit. See 3.3.61.

Exit Access. See 3.3.62.

Exit Discharge. See 3.3.63.

Externally Illuminated. See 3.3.67.

Horizontal Exit. See 3.3.103.

Internally Illuminated. See 3.3.113.

Means of Egress. See 3.3.121.

Photoluminescent. See 3.3.146.

Ramp. See 3.3.158.

Self-Luminous. See 3.3.175.

Severe Mobility Impairment. See 3.3.179.

Smokeproof Enclosure. See 3.3.186.

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 8.2.3.

Exception No. 1: This requirement shall not apply to existing buildings, provided the occupancy classification does not change.

Exception No. 2: This requirement shall not apply where otherwise provided in Chapters 12 through 42.

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.

(a) *The separation shall have not less than a 1-hour fire resistance rating where the exit connects three stories or less.

(b) *The separation shall have not less than a 2-hour fire resistance rating where the exit connects four or more stories. The separation shall be constructed of an assembly of non-combustible or limited-combustible materials and shall be supported by construction having not less than a 2-hour fire resistance rating.

Exception No. 1: In existing non-high-rise buildings, existing exit stair enclosures shall have not less than a 1-hour fire resistance rating.

Exception No. 2: In existing buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Sec-

tion 9.7, existing exit stair enclosures shall have not less than a 1-hour fire resistance rating.

Exception No. 3: One-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.

(c) Openings in the separation shall be protected by fire door assemblies equipped with door closers complying with 7.2.1.8.

(d) Openings in exit enclosures shall be limited to those necessary for access to the enclosure from normally occupied spaces and corridors and for egress from the enclosure.

Exception No. 1: Openings in exit passageways in covered mall buildings as provided in Chapters 36 and 37 shall be permitted.

Exception No. 2: In buildings of Type I or Type II construction, existing fire-protection rated doors shall be permitted to interstitial spaces provided that such space meets the following criteria:

(a) *The space is used solely for distribution of pipes, ducts, and conduits.*

(b) *The space contains no storage.*

(c) *The space is separated from the exit enclosure in accordance with 8.2.3.*

(e) Penetrations into and openings through an exit enclosure assembly shall be prohibited except for the following:

- (1) Electrical conduit serving the stairway
- (2) Required exit doors
- (3) Ductwork and equipment necessary for independent stair pressurization
- (4) Water or steam piping necessary for the heating or cooling of the exit enclosure
- (5) Sprinkler piping
- (6) Standpipes

Exception No. 1: Existing penetrations protected in accordance with 8.2.3.2.4 shall be permitted.

Exception No. 2: Penetrations for fire alarm circuits shall be permitted within enclosures where fire alarm circuits are installed in metal conduit and penetrations are protected in accordance with 8.2.3.2.4.

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

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 Exits. The flame spread of interior finish on walls and ceilings shall be limited to Class A or Class B in exit enclosures in accordance with Section 10.2. (See Chapters 12 through 42 for further limitations.)

7.1.5* Headroom. Means of egress shall be designed and maintained to provide headroom as provided in other sections of this Code and shall be not less than 7 ft 6 in. (2.3 m) with projections from the ceiling not less than 6 ft 8 in. (2 m) nominal height above the finished floor. The minimum ceiling height shall be maintained for not less than two-thirds of the ceiling area of any room or space, provided the ceiling height of remaining ceiling area is not less than 6 ft 8 in. (2 m). Headroom on stairs shall be not less than 6 ft 8 in. (2 m) and shall be measured vertically above a plane parallel to and tangent with the most forward projection of the stair tread.

Exception No. 1: In existing buildings, the ceiling height shall not be less than 7 ft (2.1 m) from the floor with no projection below a 6-ft 8-in. (2-m) nominal height from the floor.

Exception No. 2: Headroom in industrial equipment access areas provided in Chapter 40 shall be permitted.

7.1.6 Walking Surfaces in the Means of Egress.

7.1.6.1 General. Walking surfaces in the means of egress shall comply with 7.1.6.2 through 7.1.6.4.

Exception: Existing walking surfaces shall be permitted where approved by the authority having jurisdiction.

7.1.6.2 Changes in Elevation. Abrupt changes in elevation of walking surfaces shall not exceed $\frac{1}{4}$ in. (0.6 cm). Changes in elevation exceeding $\frac{1}{4}$ in. (0.6 cm), but not exceeding $\frac{1}{2}$ in. (1.3 cm), shall be beveled 1 to 2. Changes in elevation exceeding $\frac{1}{2}$ in. (1.3 cm) shall be considered a change in level and shall be subject to the requirements of 7.1.7.

7.1.6.3 Level. Walking surfaces shall be nominally level. 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. The slope perpendicular to the direction of travel shall not exceed 1 in 48.

7.1.6.4* Slip Resistance. Walking surfaces shall be slip resistant under foreseeable conditions. The walking surface of each element in the means of egress shall be uniformly slip resistant along the natural path of travel.

7.1.7 Changes in Level in Means of Egress.

7.1.7.1 Changes in level in means of egress shall be achieved either by a ramp or a stair where the elevation difference exceeds 21 in. (53.3 cm).

7.1.7.2* Changes in level in means of egress not in excess of 21 in. (53.3 cm) shall be achieved either by a ramp or by a stair complying with the requirements of 7.2.2. The presence and location of ramped portions of walkways shall be readily apparent. The tread depth of such stair shall be not less than 13 in. (33 cm), and the presence and location of each step shall be readily apparent.

Exception: Tread depth in industrial equipment access areas as provided in Chapter 40 shall be permitted.

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. (76 cm) above the floor or grade below.

7.1.9 Impediments to Egress. Any device or alarm installed to restrict the improper use of a means of egress shall be designed and installed so that it cannot, even in case of failure, impede or prevent emergency use of such means of egress 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* 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, access thereto, egress therefrom, or visibility thereof.

7.1.10.2.2 There shall be no obstructions by railings, barriers, or gates that divide the open space 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 doors. Mirrors shall not be placed in or adjacent to any exit in such a manner as to confuse the direction of egress.

SECTION 7.2 MEANS OF EGRESS COMPONENTS

7.2.1 Doors.

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. Such an assembly shall be designated as a door.

7.2.1.1.2 Every door 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 doors shall be made inaccessible to the occupants by barriers or railings.

7.2.1.1.3* For the purposes of Section 7.2, a building shall be considered to be occupied at any time it is open for general occupancy, any time it is open to the public, or at any other time it is occupied by more than 10 persons.

7.2.1.2 Width.

7.2.1.2.1* Egress Capacity Width. In determining the egress width for swinging doors for purposes of calculating capacity, only the clear width of the doorway when the door is open 90 degrees shall be measured. In determining the egress width for other types of doors for purposes of calculating capacity, only the clear width of the doorway when the door is in the full open position shall be measured. Clear width of doorways shall be measured between the face of the door and the stop in accordance with 7.3.2.

Exception: In determining the width of any existing door installation for purposes of calculating capacity, only the clear width of the doorway when the door is in the full open position shall be measured. Clear width shall be determined in accordance with 7.3.2.

7.2.1.2.2* Minimum Width Measurement. For purposes of determining minimum door width, the door leaf width shall be used unless clear width is specified. Where clear width is specified, there shall be no projections into the required clear door opening width, measured in accordance with 7.2.1.2.1, lower than 34 in. (86 cm) above the floor or ground. Projections into the required clear door opening width that are not less than 34 in. (86 cm) but that do not exceed 80 in. (203 cm) above the floor or ground shall be limited to the hinge side of each door opening and shall not exceed 4 in. (10.1 cm).

Projections exceeding 80 in. (203 cm) above the floor or ground shall not be limited.

7.2.1.2.3 Minimum Width. Door openings in means of egress shall be not less than 32 in. (81 cm) in clear width. Where a

pair of doors is provided, not less than one of the doors shall provide not less than a 32-in. (81-cm) clear width opening.

Exception No. 1: Exit access doors serving a room not exceeding 70 ft² (6.5 m²) and not required to be accessible to persons with severe mobility impairments shall be not less than 24 in. (61 cm) in door leaf width.

Exception No. 2: Doors serving a building or portion thereof not required to be accessible to persons with severe mobility impairments shall be permitted to be 28 in. (71 cm) in door leaf width.

Exception No. 3: In existing buildings, the existing door leaf width shall be not less than 28 in. (71 cm).

Exception No. 4: This requirement shall not apply as otherwise provided in Chapters 22 and 23.

Exception No. 5: This requirement shall not apply to interior doors as provided in Chapter 24.

Exception No. 6: A power-operated door leaf located within a two-leaf opening shall be exempt from the minimum 32-in. (81-cm) single-leaf requirement in accordance with Exception No. 2 to 7.2.1.9.

Exception No. 7: This requirement shall not apply to revolving doors as provided in 7.2.1.10.

7.2.1.3 Floor Level. The elevation of the floor surfaces on both sides of a door shall not vary by more than 1/2 in. (1.3 cm). The elevation shall be maintained on both sides of the doorway for a distance not less than the width of the widest leaf. Thresholds at doorways shall not exceed 1/2 in. (1.3 cm) in height. Raised thresholds and floor level changes in excess of 1/4 in. (0.64 cm) at doorways shall be bevelled with a slope not steeper than 1 in 2.

Exception No. 1: In one- and two-family dwellings and in existing buildings where the door discharges to the outside or to an exterior balcony or exterior exit access, the floor level outside the door shall be permitted to be one step lower than the inside, but shall not be in excess of 8 in. (20.3 cm) lower.

Exception No. 2: In one- and two-family dwellings and existing buildings, a door at the top of a stair shall be permitted to open directly at a stair, provided that the door does not swing over the stair and the door serves an area with an occupant load of fewer than 50 persons.

7.2.1.4 Swing and Force to Open.

7.2.1.4.1* Any door in a means of egress shall be of the side-hinged or pivoted-swinging type. The door shall be designed and installed so that it is capable of swinging from any position to the full required width of the opening in which it is installed.

Exception No. 1: Sliding doors as provided in Chapters 22 and 23, and doors as provided in Chapters 24, 32, and 33.

Exception No. 2: Where permitted in Chapters 12 through 42, horizontal sliding or vertical rolling security grilles or doors that are part of the required means of egress shall be permitted, provided that they meet the following criteria:

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

(b) On or adjacent to the grille or door, there shall be a readily visible, durable sign in letters not less than 1 in. (2.5 cm) high on a contrasting background that reads as follows:

THIS DOOR TO REMAIN OPEN

WHEN THE BUILDING IS OCCUPIED

(c) Doors or grilles shall not be brought to the closed position when the space is occupied.

(d) Doors 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 doors.

Exception No. 3: Horizontal sliding doors complying with 7.2.1.14 shall be permitted.

Exception No. 4: Doors to private garages, business areas, industrial areas, and storage areas with an occupant load not exceeding 10, where such private garages, business areas, industrial areas, and storage areas contain low or ordinary hazard contents, shall be exempt from this requirement.

Exception No. 5: Revolving doors complying with 7.2.1.10 shall be permitted.

Exception No. 6: Existing fusible link-operated horizontal sliding or vertical rolling fire doors shall be permitted to be used as provided in Chapters 12 through 42.

7.2.1.4.2 Doors required to be of the side-hinged or pivoted-swinging type shall swing in the direction of egress travel where serving a room or area with an occupant load of 50 or more.

Exception No. 1: Doors in horizontal exits shall not be required to swing in the direction of egress travel where exempted in 7.2.4.3.6.

Exception No. 2: Smoke barrier doors shall not be required to swing in the direction of egress travel as provided in Chapter 19.

7.2.1.4.3 A door shall swing in the direction of egress travel where used in an exit enclosure or where serving a high hazard contents area, unless it is a door from an individual living unit that opens directly into an exit enclosure.

7.2.1.4.4* During its swing, any door in a means of egress shall leave not less than one-half of the required width of an aisle, corridor, passageway, or landing unobstructed and shall not project more than 7 in. (17.8 cm) into the required width of an aisle, corridor, passageway, or landing, when fully open. Doors shall not open directly onto a stair without a landing. The landing shall have a width not less than the width of the door. (See 7.2.1.3.)

Exception: In existing buildings, a door providing access to a stair shall not be required to maintain any minimum unobstructed width during its swing, provided that it meets the requirement that limits projection to not more than 7 in. (17.8 cm) into the required width of a stair or landing when the door is fully open.

7.2.1.4.5 The forces required to fully open any door manually in a means of egress shall not exceed 15 lbf (67 N) to release the latch, 30 lbf (133 N) to set the door in motion, and 15 lbf (67 N) to open the door to the minimum required width. Opening forces for interior side-hinged or pivoted-swinging doors without closers shall not exceed 5 lbf (22 N). These forces shall be applied at the latch stile.

Exception No. 1: The opening force for existing doors in existing buildings shall not exceed 50 lbf (222 N) applied to the latch stile.

Exception No. 2: The opening forces for horizontal sliding doors shall be as provided in Chapters 22 and 23.

Exception No. 3: The opening forces for power-operated doors shall be as provided in 7.2.1.9.

7.2.1.4.6 Screen doors and storm doors used in a means of egress shall be subject to the requirements for direction of swing that are applicable to other doors used in a means of egress.

7.2.1.5 Locks, Latches, and Alarm Devices.

7.2.1.5.1 Doors shall be arranged to be opened readily from the egress side whenever the building is occupied. Locks, if provided, shall not require the use of a key, a tool, or special knowledge or effort for operation from the egress side.

Exception No. 1: This requirement shall not apply where otherwise provided in Chapters 18 through 23.

Exception No. 2: Exterior doors shall be permitted to have key-operated locks from the egress side, provided that the following criteria are met:

(a) *Permission to use this exception is provided in Chapters 12 through 42 for the specific occupancy.*

(b) *On or adjacent to the door, there is a readily visible, durable sign in letters not less than 1 in. (2.5 cm) high on a contrasting background that reads as follows:*

**THIS DOOR TO REMAIN UNLOCKED
WHEN THE BUILDING IS OCCUPIED**

(c) *The locking device is of a type that is readily distinguishable as locked.*

(d) *A key is immediately available to any occupant inside the building when it is locked.*

Exception No. 2 shall be permitted to be revoked by the authority having jurisdiction for cause.

Exception No. 3: Where permitted in Chapters 12 through 42, key operation shall be permitted, provided that the key cannot be removed when the door is locked from the side from which egress is to be made.

7.2.1.5.2* Every door in a stair enclosure serving more than four stories shall allow re-entry from the stair enclosure to the interior of the building, or an automatic release shall be provided to unlock all stair enclosure doors to allow re-entry. Such automatic release shall be actuated with the initiation of the building fire alarm system.

Exception No. 1: Doors on stair enclosures shall be permitted to be equipped with hardware that prevents re-entry into the interior of the building, provided that the following criteria are met:

(a) *There shall be not less than two levels where it is possible to leave the stair enclosure.*

(b) *There shall be not more than four stories intervening between stories where it is possible to leave the stair enclosure.*

(c) *Re-entry shall be possible on the top or next to top story that allows access to another exit.*

(d) *Doors allowing re-entry shall be identified as such on the stair side of the door.*

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

Exception No. 2: This requirement shall not apply to the following:

(a) *Existing installations as permitted in Chapters 12 through 42*

(b) *Stair enclosures serving a building permitted to have a single exit in accordance with Chapters 11 through 42*

(c) *Stair enclosures where otherwise provided in Chapters 18 and 22*

7.2.1.5.3 If a stair enclosure allows access to the roof of the building, the door to the roof either shall be kept locked or shall allow re-entry from the roof.

7.2.1.5.4* A latch or other fastening device on a door shall be provided with a releasing device having an obvious method of operation and that is readily operated under all lighting conditions. The releasing mechanism for any latch shall be

located not less than 34 in. (86 cm), and not more than 48 in. (122 cm), above the finished floor. Doors shall be operable with not more than one releasing operation.

*Exception No. 1:** *Egress doors from individual living units and guest rooms of residential occupancies shall be permitted to be provided with devices that require not more than one additional releasing operation, provided that such device is operable from the inside without the use of a key or tool and is mounted at a height not exceeding 48 in. (122 cm) above the finished floor. Existing security devices shall be permitted to have two additional releasing operations. Existing security devices other than automatic latching devices shall not be located more than 60 in. (152 cm) above the finished floor. Automatic latching devices shall not be located more than 48 in. (122 cm) above the finished floor.*

Exception No. 2: The minimum mounting height for the releasing mechanism shall not be applicable to existing installations.

7.2.1.5.5 Where pairs of doors are required in a means of egress, each leaf of the pair shall be provided with its own releasing device. Devices that depend on the release of one door before the other shall not be used.

Exception: Where exit doors are used in pairs and approved automatic flush bolts are used, the door leaf equipped with the automatic flush bolts shall have no doorknob or surface-mounted hardware. The unlatching of any leaf shall not require more than one operation.

7.2.1.5.6* Devices shall not be installed in connection with any door on which panic hardware or fire exit hardware is required where such device prevents or is intended to prevent the free use of the door for purposes of egress.

Exception: This requirement shall not apply where otherwise provided in 7.2.1.6.

7.2.1.6 Special Locking Arrangements.

7.2.1.6.1 Delayed-Egress Locks. Approved, listed, delayed-egress locks shall be permitted to be installed on doors 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 12 through 42, provided that the following criteria are met.

(a) The doors shall unlock upon actuation of an approved, supervised automatic sprinkler system in accordance with Section 9.7 or upon the actuation of any heat detector or activation of not more than two smoke detectors of an approved, supervised automatic fire detection system in accordance with Section 9.6.

(b) The doors shall unlock upon loss of power controlling the lock or locking mechanism.

(c) An irreversible process shall release the lock within 15 seconds upon application of a force to the release device required in 7.2.1.5.4 that shall not be required to exceed 15 lbf (67 N) nor be required to be continuously applied for more than 3 seconds. The initiation of the release process shall activate an audible signal in the vicinity of the door. Once the door lock has been released by the application of force to the releasing device, relocking shall be by manual means only.

Exception: Where approved by the authority having jurisdiction, a delay not exceeding 30 seconds shall be permitted.

(d) *On the door adjacent to the release device, there shall be a readily visible, durable sign in letters not less than

1 in. (2.5 cm) high and not less than $\frac{1}{8}$ in. (0.3 cm) in stroke width on a contrasting background that reads as follows:

PUSH UNTIL ALARM SOUNDS

DOOR CAN BE OPENED IN 15 SECONDS

7.2.1.6.2 Access-Controlled Egress Doors. Where permitted in Chapters 11 through 42, doors in the means of egress shall be permitted to be equipped with an approved entrance and egress access control system, provided that the following criteria are met.

(a) A sensor shall be provided on the egress side and arranged to detect an occupant approaching the doors, and the doors shall be arranged to unlock in the direction of egress upon detection of an approaching occupant or loss of power to the sensor.

(b) Loss of power to the part of the access control system that locks the doors shall automatically unlock the doors in the direction of egress.

(c) The doors shall be arranged to unlock in the direction of egress from a manual release device located 40 in. to 48 in. (102 cm to 122 cm) vertically above the floor and within 5 ft (1.5 m) of the secured doors. The manual release device shall be readily accessible and clearly identified by a sign that reads as follows:

PUSH TO EXIT

When operated, the manual release device shall result in direct interruption of power to the lock — independent of the access control system electronics — and the doors shall remain unlocked for not less than 30 seconds.

(d) Activation of the building fire-protective signaling system, if provided, shall automatically unlock the doors in the direction of egress, and the doors shall remain unlocked until the fire-protective signaling system has been manually reset.

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

7.2.1.7 Panic Hardware and Fire Exit Hardware.

7.2.1.7.1 Where a door is required to be equipped with panic or fire exit hardware, such hardware shall meet the following criteria:

(1) It shall consist of cross bars or push pads, the actuating portion of which extends across not less than one-half of the width of the door leaf and not less than 34 in. (86 cm), nor not more than 48 in. (122 cm), above the floor.

Exception: Existing installations shall be permitted to be minimum 30 in. (76 cm) above the floor.

(2) 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 Only approved panic hardware shall be used on doors that are not fire doors. Only approved fire exit hardware shall be used on fire doors.

7.2.1.7.3 Required panic hardware and fire exit hardware 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. Devices that hold the latch in the retracted position shall be prohibited on fire exit hardware unless listed and approved for that purpose.

Exception: This requirement shall not apply where otherwise provided in Chapters 22 and 23.

7.2.1.8 Self-Closing Devices.

7.2.1.8.1* A door 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.

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, doors shall be permitted to be automatic-closing, provided that the following criteria are met:

- (1) Upon release of the hold-open mechanism, the door becomes self-closing.
- (2) The release device is designed so that the door instantly releases manually and upon release becomes self-closing, or the door 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 release service in NFPA 72, *National Fire Alarm Code*[®].
- (4) Upon loss of power to the hold-open device, the hold-open mechanism is released and the door becomes self-closing.
- (5) The release by means of smoke detection of one door in a stair enclosure results in closing all doors serving that stair.

7.2.1.9* Powered Doors.

7.2.1.9.1* General. Where means of egress doors are operated by power upon the approach of a person or doors with power-assisted manual operation, the design shall be such that, in the event of power failure, the door opens manually to allow egress travel or closes where necessary to safeguard the means of egress. The forces required to open such doors manually shall not exceed those required in 7.2.1.4.5, except that the force required to set the door in motion shall not exceed 50 lbf (222 N). The door shall be designed and installed so that when a force is applied to the door on the side from which egress is made, it shall be capable of swinging from any position to the full use of the required width of the opening in which it is installed (*see* 7.2.1.4). On the egress side of each door, there shall be a readily visible, durable sign that reads as follows:

IN EMERGENCY, PUSH TO OPEN

The sign shall be in letters not less than 1 in. (2.5 cm) high on a contrasting background.

Exception No. 1: Sliding, power-operated doors in exit access serving an occupant load of fewer than 50 that manually open in the direction of door travel with forces not exceeding those required in 7.2.1.4.5 shall not be required to have a swing-out feature. The required sign shall read as follows:

IN EMERGENCY, SLIDE TO OPEN

Exception No. 2: In the emergency breakout mode, a door leaf located within a two-leaf opening shall be exempt from the minimum 32-in. (81-cm) single-leaf requirement of 7.2.1.2.3, provided that the clear width of the single leaf is not less than 30 in. (76 cm).*

Exception No. 3: For a biparting sliding door in the emergency breakout mode, a door leaf located within a multiple-leaf opening shall be exempt from the minimum 32-in. (81-cm) single-leaf requirement of

7.2.1.2.3 if a clear opening of not less than 32 in. (81 cm) is provided by all leaves broken out.

Exception No. 4: Doors complying with 7.2.1.14 shall be permitted to be used.

Exception No. 5: This requirement shall not apply where otherwise provided in Chapters 22 and 23.

7.2.1.9.2 Doors Required to Be Self-Closing. Where doors are required to be self-closing and (1) are operated by power upon the approach of a person or (2) are provided with power-assisted manual operation, they shall be permitted in the means of egress under the following conditions:

- (1) Doors can be opened manually in accordance with 7.2.1.9.1 to allow egress travel in the event of power failure.
- (2) New doors remain in the closed position unless actuated or opened manually.
- (3) When actuated, new doors remain open for not more than 30 seconds.
- (4) Doors 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, *National Fire Alarm Code*.
- (5) Doors 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 doors comply with BHMA/ANSI A156.19, *American National Standard for Power Assist and Low Energy Power Operated Doors*.

7.2.1.10 Revolving Doors.

7.2.1.10.1 Revolving doors shall comply with the following.

- (a) Revolving doors shall be capable of being collapsed into a book-fold position, unless they are existing revolving doors approved by the authority having jurisdiction.
- (b) When revolving doors are collapsed into the book-fold position, the parallel egress paths formed shall provide an aggregate width of 36 in. (91 cm), unless they are existing revolving doors approved by the authority having jurisdiction.
- (c) Revolving doors shall not be used within 10 ft (3 m) of the foot or the top of stairs or escalators. Under all conditions, there shall be a dispersal area acceptable to the authority having jurisdiction between the stairs or escalators and the revolving door.
- (d) The revolutions per minute (rpm) of revolving doors shall not exceed the values in Table 7.2.1.10.1.

Table 7.2.1.10.1 Revolving Door Maximum Speed

Inside Diameter	Power-Driven Speed Control (rpm)	Manual Speed Control (rpm)
6 ft 6 in. (2 m)	11	12
7 ft 0 in. (2.1 m)	10	11
7 ft 6 in. (2.3 m)	9	11
8 ft 0 in. (2.4 m)	9	10
8 ft 6 in. (2.6 m)	8	9
9 ft 0 in. (2.7 m)	8	9
9 ft 6 in. (2.9 m)	7	8
10 ft 0 in. (3.0 m)	7	8

(e) Each revolving door shall have a conforming side-hinged swinging door in the same wall as the revolving door and within 10 ft (3 m) of the revolving door.

Exception No. 1: Revolving doors shall be permitted without adjacent swinging doors, required by 7.2.1.10.1(e), for street floor elevator lobbies, provided that no stairways or doors 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.

Exception No. 2: The requirement of 7.2.1.10.1(e) shall not apply to existing revolving doors where the number of revolving doors does not exceed the number of swinging doors within 20 ft (6.1 m).

7.2.1.10.2 Where permitted in Chapters 12 through 42, revolving doors shall be permitted as a component in a means of egress, provided that the following criteria are met:

- (1) Revolving doors shall not be given credit for more than 50 percent of the required egress capacity.
- (2) Each revolving door shall not be credited with not more than 50 persons capacity or, if of not less than a 9-ft (2.7-m) diameter, revolving doors shall be permitted egress capacity based on the clear opening width provided when collapsed into a book-fold position.
- (3) Revolving doors shall be capable of being collapsed into a book-fold position when a force not exceeding 130 lbf (578 N) is applied to the wings within 3 in. (7.6 cm) of the outer edge.

7.2.1.10.3 Revolving doors not used as a component of a means of egress shall have a collapsing force not exceeding 180 lbf (800 N).

Exception: This requirement shall not apply to revolving doors, provided that the collapsing force is reduced to a force not to exceed 130 lbf (578 N) under the following conditions:

- (a) *If a power failure occurs, or if power is removed to the device holding the wings in position*
- (b) *If an actuation of the automatic sprinkler system occurs where such a system is provided*
- (c) *If an 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 doors occurs*
- (d) *If an 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 (578 N) occurs*

7.2.1.11 Turnstiles.

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.

Exception No. 1: Approved turnstiles not exceeding 39 in. (99 cm) in height that turn freely in the direction of egress travel shall be permitted where revolving doors are permitted in Chapters 12 through 42.

Exception No. 2: Where turnstiles are approved by the authority having jurisdiction and permitted in Chapters 12 through 42, each turnstile shall be credited for 50 persons capacity, provided that such turnstiles meet the following criteria:

- (a) *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.*
- (b) *They are not given credit for more than 50 percent of the required egress width.*

(c) They are not in excess of 39 in. (99 cm) in height and have a clear width of not less than 16¹/₂ in. (41.9 cm).

7.2.1.11.2 Turnstiles exceeding 39 in. (99 cm) in height shall meet the requirements for revolving doors in 7.2.1.10.

7.2.1.11.3 Turnstiles located in or furnishing access to required exits shall provide not less than 16¹/₂ in. (41.9 cm) clear width at and below a height of 39 in. (99 cm) and at least 22 in. (55.9 cm) clear width at heights above 39 in. (99 cm).

7.2.1.12 Doors in Folding Partitions. Where permanently mounted folding or movable partitions divide a room into smaller spaces, a swinging door or open doorway shall be provided as an exit access from each such space.

Exception No. 1: A door or opening in the folding partition shall not be required, provided that the following criteria are met:

- (a) The subdivided space is not used by more than 20 persons at any time.
- (b) The use of the space is under adult supervision.
- (c) 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.
- (d) The partitions conform to the interior finish and other requirements of this Code.
- (e) 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.

Exception No. 2: Where a subdivided space is provided with not less than two means of egress, the swinging door in the folding partition shall not be required, and one such means of egress shall be permitted to be equipped with a horizontal sliding door complying with 7.2.1.14.

7.2.1.13 Balanced Doors. If panic hardware is installed on balanced doors, the panic hardware shall be of the push-pad type, and the pad shall not extend more than approximately one-half the width of the door, measured from the latch side. (See 7.2.1.7.1(1).)

7.2.1.14 Horizontal Sliding Doors. Horizontal sliding doors shall be permitted in means of egress, provided that the following criteria are met:

- (1) The door is readily operable from either 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 door 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 with a force not more than 50 lbf (222 N) when a force of 250 lbf (1110 N) is applied perpendicularly to the door adjacent to the operating device, unless the door is an existing horizontal sliding exit access door serving an area with an occupant load of fewer than 50.
- (5) The door assembly complies with the 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, *Standard for Fire Doors and Fire Windows*.

7.2.2 Stairs.

7.2.2.1 General. 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 this subsection.

Exception No. 1: This requirement shall not apply to aisle stairs as provided in Chapters 12 and 13.

Exception No. 2: This requirement shall not apply to existing noncomplying stairs where approved by the authority having jurisdiction.

7.2.2.2 Dimensional Criteria.

7.2.2.2.1 Standard Stairs. Stairs shall be in accordance with the following:

- (a) New stairs shall be in accordance with Table 7.2.2.2.1(a).

Exception: This requirement shall not apply to industrial equipment access areas as otherwise provided in Chapter 40.

Table 7.2.2.2.1(a) New Stairs

Minimum width clear of all obstructions, except projections not more than 3 ¹ / ₂ in. (8.9 cm) at or below handrail height on each side	44 in. (112 cm); 36 in. (91 cm) where total occupant load of all stories served by stairways is fewer than 50
Maximum height of risers	7 in. (17.8 cm)
Minimum height of risers	4 in. (10.2 cm)
Minimum tread depth	11 in. (27.9 cm)
Minimum headroom	6 ft 8 in. (203 cm)
Maximum height between landings	12 ft (3.7 m)
Landing	(See 7.2.1.3 and 7.2.1.4.4.)

(b) *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(b). Where approved by the authority having jurisdiction, existing stairs shall be permitted to be rebuilt in accordance with the dimensional criteria of Table 7.2.2.2.1(b) and in accordance with other Code requirements in 7.2.2 for stairs.

Table 7.2.2.2.1(b) Existing Stairs

Feature	Class A	Class B
Minimum width clear of all obstructions, except projections not more than 3 ¹ / ₂ in. (8.9 cm) at or below handrail height on each side	44 in. (112 cm)	44 in. (112 cm)
	36 in. (91 cm) where total occupant load of all stories served by stairways is fewer than 50	
Maximum height of risers	7 ¹ / ₂ in. (19.1 cm)	8 in. (20.3 cm)
Minimum tread depth	10 in. (25.4 cm)	9 in. (22.9 cm)
Minimum headroom	6 ft 8 in. (203 cm)	6 ft 8 in. (203 cm)
Maximum height between landings	12 ft (3.7 m)	12 ft (3.7 m)
Landing	(See 7.2.1.3 and 7.2.1.4.4.)	

Exception: This requirement shall not apply to industrial equipment access areas as otherwise provided in Chapter 40.

7.2.2.2.2 Curved Stairs. 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. (27.9 cm) at a point 12 in. (30.5 cm) from the narrower end of the tread and the smallest radius is not less than twice the stair width.

Exception: Existing curved stairs shall be permitted, provided that the depth of tread is not less than 10 in. (25.4 cm) 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 12 through 42, 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 the following criteria are met:

- (1) Riser heights shall not exceed 7 in. (17.8 cm).
- (2) The stairway shall have a tread depth of not less than 11 in. (27.9 cm) 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 10¹/₂ in. (26.7 cm) 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. (61.0 cm), measured horizontally, of the point where a tread depth not less than 11 in. (27.9 cm) is provided.
- (6) The turn of the stairway shall be such that descending users have the outer handrail at their right side.

7.2.2.2.3.3 Where the occupant load served does not exceed three, spiral stairs shall be permitted, provided that the following criteria are met:

- (1) The clear width of the stairs shall be not less than 26 in. (66 cm).
- (2) The height of risers shall not exceed 9¹/₂ in. (24.1 cm).
- (3) The headroom shall be not less than 6 ft 6 in. (198 cm).
- (4) Treads shall have a depth not less than 7¹/₂ in. (19.1 cm) at a point 12 in. (30.5 cm) 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 Within dwelling units, guest rooms and guest suites, and existing buildings, where the occupant load served does not exceed five, spiral stairs shall be permitted, provided that the following criteria are met:

- (1) The clear width of the stairs shall be not less than 26 in. (66 cm).
- (2) The height of risers shall not exceed 9¹/₂ in. (24.1 cm).
- (3) The headroom shall be not less than 6 ft 6 in. (198 cm).
- (4) Treads shall have a depth not less than 7¹/₂ in. (19.1 cm) at a point 12 in. (30.5 cm) from the narrower edge.
- (5) All treads shall be identical.

7.2.2.2.4* Winders. Where specified in Chapters 12 through 42, winders shall be permitted in stairs. Winders shall have a tread depth not less than 6 in. (15.2 cm) and a tread depth not

less than 11 in. (27.9 cm) at a point 12 in. (30.5 cm) from the narrowest edge.

Exception: Existing winders shall be permitted to be continued in use, provided that they have a tread depth not less than 6 in. (15.2 cm) and a tread depth not less than 9 in. (22.9 cm) at a point 12 in. (30.5 cm) 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. Stairs shall have landings at door openings. Stairs and intermediate landings shall continue with no decrease in width along the direction of egress travel. 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.

Exception No. 1: Landings shall not be required to exceed 4 ft (122 cm) in the direction of travel, provided that the stair has a straight run.

Exception No. 2: In one- and two-family dwellings and existing buildings, a door at the top of the stair shall be permitted to open directly at a stair, provided that the door does not swing over the stair and the door serves an area with an occupant load of fewer than 50 persons.

7.2.2.3.3* Tread and Landing Surfaces. Stair treads and landings shall be solid, without perforations, and free of projections or lips that could trip stair users. If not vertical, risers shall be permitted to slope under the tread at an angle not to exceed 30 degrees from vertical; however, the permitted projection of the nosing shall not exceed 1¹/₂ in. (3.8 cm).

Exception No. 1: This requirement shall not apply to noncombustible graded stair treads and landings as provided in Chapters 12, 13, 22, 23, and 40.

Exception No. 2: The requirement for the maximum projection of the nosing shall not apply to existing stairs.

7.2.2.3.4* Tread Slope. Tread slope shall not exceed 1/4 in. /ft (2 cm/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 bevelled or rounded tread surfaces that slope more than 20 degrees (a slope of 1 in 2.75). At tread nosings, such bevelling or rounding shall not exceed 1/2 in. (1.3 cm) in horizontal dimension.

7.2.2.3.6 Dimensional Uniformity. There shall be no variation in excess of 3/16 in. (0.5 cm) in the depth of adjacent treads or in the height of adjacent risers, and the tolerance between the largest and smallest riser or between the largest and smallest tread shall not exceed 3/8 in. (1 cm) in any flight.

Exception: Where the bottom riser adjoins a sloping public way, walk, or driveway having an established grade and serving as a landing, a

variation in height of the bottom riser not to exceed 3 in. in every 3 ft (7.6 cm in every 91 cm) of stairway width shall be permitted.

7.2.2.4 Guards and Handrails.

7.2.2.4.1* Guards. Means of egress that are more than 30 in. (76 cm) above the floor or grade below shall be provided with guards to prevent falls over the open side.

7.2.2.4.2* Handrails. Stairs and ramps shall have handrails on both sides. In addition, handrails shall be provided within 30 in. (76 cm) of all portions of the required egress width of stairs. The required egress width shall be provided along the natural path of travel. (See also 7.2.2.4.5.)

Exception No. 1: On existing stairs, handrails shall be provided within 44 in. (112 cm) of all portions of the required egress width of stairs.

Exception No. 2: 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.

Exception No. 3: Existing stairs, existing ramps, stairs within dwelling units and within guest rooms, and ramps within dwelling units and guest rooms shall be permitted to have a handrail on one side only.

7.2.2.4.3 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.

7.2.2.4.4 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.

7.2.2.4.5* Handrail Details.

- (1) Handrails on stairs shall be not less than 34 in. (86 cm) and not more than 38 in. (96 cm) above the surface of the tread, measured vertically to the top of the rail from the leading edge of the tread.

Exception No. 1: The height of required handrails that form part of a guard shall be permitted to exceed 38 in. (96 cm) but shall not exceed 42 in. (107 cm), measured vertically to the top of the rail from the leading edge of the tread.

Exception No. 2: Existing required handrails shall be permitted to be not less than 30 in. (76 cm) and not more than 38 in. (96 cm) above the upper surface of the tread, measured vertically to the top of the rail from the leading edge of the tread.

Exception No. 3: Additional handrails that are lower or higher than the main handrail shall be permitted.*

- (2) *New handrails shall provide a clearance of not less than 1¹/₂ in. (3.8 cm) between the handrail and the wall to which it is fastened.
- (3) *Handrails shall have a circular cross section with an outside diameter of not less than 1¹/₄ in. (3.2 cm) and not more than 2 in. (5 cm).

Exception: Any other shape with a perimeter dimension of not less than 4 in. (10.2 cm), but not more than 6¹/₄ in. (15.9 cm), and with the largest cross-sectional dimension not more than 2¹/₄ in. (5.7 cm) shall be permitted, provided that edges are rounded so as to provide a radius of not less than 1¹/₈ in. (0.3 cm).

- (4) New handrails shall be continuously graspable along their entire length.

Exception: Handrail brackets or balusters attached to the bottom surface of the handrail shall not be considered to be obstructions to graspability, provided that the following criteria are met:

(a) They do not project horizontally beyond the sides of the handrail within 1¹/₂ in. (3.75 cm) of the bottom of the handrail and provided that, for each 1¹/₂ in. (1.3 cm) of additional handrail perimeter dimension above 4 in. (10 cm), the vertical clearance dimension of 1¹/₂ in. (3.75 cm) can be reduced by 1¹/₈ in. (0.3 cm).

(b) They have edges with a radius of not less than 1¹/₈ in. (0.3 cm).

(c) They obstruct not in excess of 20 percent of the handrail length.

- (5) New handrail ends shall be returned to the wall or floor or shall terminate at newel posts.

- (6) New handrails that are not continuous between flights shall extend horizontally, at the required height, not less than 12 in. (30.5 cm) beyond the top riser and continue to slope for a depth of one tread beyond the bottom riser.

Exception: Within dwelling units the handrail shall be permitted to extend, at the required height, to points directly above the top and bottom risers.

7.2.2.4.6 Guard Details.

- (1) The height of guards required in 7.2.2.4.1 shall be measured vertically to the top of the guard from the surface adjacent thereto.
- (2) Guards shall be not less than 42 in. (107 cm) high.

Exception No. 1: Existing guards within dwelling units shall be permitted to be not less than 36 in. (91 cm) high.

Exception No. 2: The requirement of 7.2.2.4.6(2) shall not apply where otherwise provided in Chapters 12 and 13.

Exception No. 3: Existing guards on existing stairs shall be permitted to be not less than 30 in. (76 cm) high.*

- (3) *Open guards, other than approved, existing open guards, shall have intermediate rails or an ornamental pattern such that a sphere 4 in. (10.1 cm) in diameter shall not pass through any opening up to a height of 34 in. (86 cm).

Exception No. 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. (15.2 cm) in diameter shall not pass through the triangular opening.

Exception No. 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. (53.3 cm).

7.2.2.5 Enclosure and Protection of Stairs.

7.2.2.5.1 Enclosures. All inside stairs serving as an exit or exit component shall be enclosed in accordance with 7.1.3.2. All other inside stairs shall be protected in accordance with 8.2.5.

Exception: 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. 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 (3 m) horizontally of the nonrated wall or unprotected opening shall be constructed as required for stairway enclosures, including open-

ing protectives. Construction shall extend vertically from the ground to a point 10 ft (3 m) above the topmost landing of the stairs or to the roofline, whichever is lower.

Exception: The fire resistance rating of the separation extending 10 ft (3 m) from the stairs shall not be required to exceed 1 hour where openings have not less than a $3/4$ -hour fire protection rating.

7.2.2.5.3* Usable Space. There shall be no enclosed, usable space within an exit enclosure, including under stairs, nor shall any open space within the enclosure be used for any purpose that has the potential to interfere with egress.

Exception: Enclosed, usable space shall be permitted under stairs, provided that the space is separated from the stair enclosure by the same fire resistance as the exit enclosure. Entrance to such enclosed usable space shall not be from within the stair enclosure. (See also 7.1.3.2.3.)

7.2.2.5.4* Stair Identification Signs. Stairs serving five or more stories shall be provided with signage within the enclosure at each floor landing. The signage shall indicate the story, the terminus of the top and bottom of the stair enclosure, and the identification of the stair enclosure. The signage also shall state the story of, and the direction to, exit discharge. The signage shall be inside the enclosure located approximately 5 ft (1.5 m) above the floor landing in a position that is readily visible when the door is in the open or closed position.

7.2.2.5.5 Egress Direction Signs. Wherever an enclosed stair requires travel in an upward direction to reach the level of exit discharge, signs with directional indicators indicating the direction to the level of exit discharge shall be provided at each floor level landing from which upward direction of travel is required. Such signage shall be readily visible when the door is in the open or closed position.

Exception No. 1: This requirement shall not apply where signs required by 7.2.2.5.4 are provided.

Exception No. 2: Stairs extending not more than one story below the level of exit discharge where the exit discharge is clearly obvious shall not be subject to this requirement.

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 the use of the stairs by persons having a fear of high places. For stairs more than three stories in height, any arrangement intended to meet this requirement shall be not less than 4 ft (1.2 m) in height.

7.2.2.6.3 Separation and Protection of Outside Stairs. Outside stairs shall be separated from the interior of the building by walls with the fire resistance rating required for enclosed stairs with fixed or self-closing opening protectives. This construction shall extend vertically from the ground to a point 10 ft (3 m) above the topmost landing of the stairs or to the roofline, whichever is lower, and to a point not less than 10 ft (3 m) horizontally.

Exception No. 1: Outside stairs serving an exterior exit access balcony that has two remote outside stairways or ramps shall be permitted to be unprotected.

Exception No. 2: Outside stairs serving not in excess of two adjacent stories, including the story of exit discharge, shall be permitted to be unprotected where there is a remotely located second exit.

Exception No. 3: In existing buildings, existing outside stairs serving not in excess of three adjacent stories, including the story of exit discharge, shall be permitted to be unprotected where there is a remotely located second exit.

Exception No. 4: The fire resistance rating of the separation extending 10 ft (3 m) from the stairs shall not be required to exceed 1 hour where openings have not less than a $3/4$ -hour fire protection rating.

7.2.2.6.4 Protection of Openings. All openings below an outside stair shall be protected with an assembly having not less than a $3/4$ -hour fire protection rating as follows:

- (1) Where located in a court, 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 existing smokeproof enclosures approved by the authority having jurisdiction.

7.2.3.2 Performance Design. An appropriate design method shall be used to provide a system that meets the definition of smokeproof enclosure. 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. A smokeproof enclosure shall be enclosed from the highest point to the lowest point by barriers having 2-hour fire resistance ratings. Where a vestibule is used, it shall be within the 2-hour-rated enclosure and shall be considered part of the smokeproof enclosure.

7.2.3.4 Vestibule. Where a vestibule is provided, the doorway into the vestibule shall be protected with an approved fire door assembly having a $1\frac{1}{2}$ -hour fire protection rating, and the fire door assembly from the vestibule to the smokeproof enclosure shall have not less than a 20-minute fire protection rating. Doors 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 (3 m) of the vestibule door.

7.2.3.5 Discharge. 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 from the smokeproof enclosure and the door 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.

7.2.3.6 Access. Access to the smokeproof enclosure stair shall be by way of a vestibule or by way of an exterior balcony.

Exception: This requirement shall not apply to smokeproof enclosures consisting of a pressurized stair enclosure complying with 7.2.3.9.

7.2.3.7 Natural Ventilation. Smokeproof enclosures using natural ventilation shall comply with 7.2.3.3 and the following.

(a) Where access to the stair is by means of an open exterior balcony, the door assembly to the stair shall have a 1¹/₂-hour fire protection rating and shall be self-closing or shall be automatic-closing by actuation of a smoke detector. Openings adjacent to such exterior balconies shall be protected in accordance with 7.2.2.6.5.

(b) Every vestibule shall have a net area of not less than 16 ft² (1.5 m²) of opening in an exterior wall facing an exterior court, yard, or public space not less than 20 ft (6.1 m) in width.

(c) 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 72 in. (183 cm) 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 following.

(a) Vestibules shall have a dimension of not less than 44 in. (112 cm) in width and not less than 72 in. (183 cm) in direction of travel.

(b) 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 those purposes. Supply air shall enter the vestibule within 6 in. (15.2 cm) of the floor level. The top of the exhaust register shall be located not more than 6 in. (15.2 cm) below the top of the trap and shall be entirely within the smoke trap area. Doors, 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.

(c) 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. (50.8 cm) higher than the door opening into the vestibule. The height shall be permitted to be decreased where justified by engineering design and field testing.

(d) The stair shall be provided with a dampered relief opening at the top and supplied mechanically with sufficient air to discharge at least 2500 ft³/min (70.8 m³/min) through the relief opening while maintaining a positive pressure of not less than 0.10 in. water column (25 Pa) in the stair relative to the vestibule with all doors closed.

7.2.3.9 Stair Pressurization.

7.2.3.9.1* Smokeproof enclosures using stair 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 Pa) in sprinklered buildings, or 0.10 in. water column (25 Pa) in nonsprinklered buildings, and shall be capable of maintaining these pressure differences under likely conditions of stack effect or wind. The pressure difference across doors shall exceed that which allows the door to begin to be opened by a force of 30 lbf (133 N) in accordance with 7.2.1.4.5.

7.2.3.9.2 Equipment and ductwork for stair pressurization shall be located as specified by one of the following:

- (1) Exterior to the building and directly connected to the stairway by ductwork enclosed in noncombustible construction
- (2) Within the stair enclosure with intake and exhaust air directly to the outside or through ductwork enclosed by a 2-hour fire-resistive rating
- (3) Within the building if separated from the remainder of the building, including other mechanical equipment, by a 2-hour fire-resistive rating

Exception: Where the building, including the stairway enclosure, is protected throughout by an approved, supervised automatic sprinkler system installed in accordance with Section 9.7, the fire resistance rating shall be permitted to be not less than 1 hour.

In all cases specified by 7.2.3.9.2(1) through (3), openings into the required fire resistance rating shall be limited to those needed for maintenance and operation and shall be protected by self-closing fire protection-rated devices in accordance with 8.2.3.2.3.

7.2.3.10 Activation of Mechanical Ventilation and Pressurized Stair Systems.

7.2.3.10.1 For both mechanical ventilation and pressurized stair enclosure systems, the activation of the systems shall be initiated by a smoke detector installed in an approved location within 10 ft (3 m) of the entrance to the smokeproof enclosure.

7.2.3.10.2 The required mechanical systems 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 Closers. The activation of an automatic-closing device on any door in the smokeproof enclosure shall activate all other automatic-closing devices on doors in the smokeproof enclosure.

7.2.3.12 Standby Power. Standby power for mechanical ventilation equipment shall be provided by an approved, self-contained generator that is set to operate whenever there is a loss of power in the normal house current. The generator shall be located in a room having a minimum 1-hour fire resistance-rated separation from the remainder of the building. The generator shall have a fuel supply not less than that which is adequate to operate the equipment for 2 hours.

7.2.3.13 Testing. Before the mechanical equipment is accepted by the authority having jurisdiction, it shall be tested to confirm that the mechanical equipment 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 requirements of 7.2.4.

7.2.4.1.2* Horizontal exits shall be permitted to be substituted for other exits where the total egress capacity of the other exits (stairs, ramps, doors leading outside the building)

is not less than half that required for the entire area of the building or connected buildings and provided that none of the other exits is a horizontal exit.

Exception: This requirement shall not apply where otherwise provided in Chapters 18, 19, 22, and 23.

7.2.4.2 Fire Compartments.

7.2.4.2.1 Every fire compartment for which credit is allowed in connection with a horizontal exit shall have, in addition to the horizontal exit or exits, at least one exit, but not less than 50 percent of the required number and capacity of exits, that is not a horizontal exit. 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.

Exception: This requirement shall not apply where otherwise provided in Chapters 18, 19, 22, and 23.

7.2.4.2.2 Every horizontal exit for which credit is given 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 the horizontal exit is occupied, the doors used in connection with the horizontal exit shall be unlocked from the egress side.

Exception: This requirement shall not apply where otherwise provided in Chapters 18, 19, 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, providing at least 3 ft² (0.28 m²) clear floor area per person.

Exception: Special floor area requirements shall be permitted where provided in Chapters 18, 19, 22, and 23.

7.2.4.3 Fire Barriers.

7.2.4.3.1 Fire barriers separating building areas between which there are horizontal exits shall have a 2-hour fire resistance rating and shall provide a separation that is continuous to ground. (See also 8.2.3.)

Exception: 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 the following criteria are met:

(a) *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.*

(b) *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.*

(c) *All required exits, other than horizontal exits, discharge directly to the outside.*

7.2.4.3.2 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 (3 m) on each side of the horizontal exit, the outside walls shall have not less than a 1-hour fire resistance rating with not less than ³/₄-hour fire protection rating opening protectives for a distance of 10 ft (3 m) on each side of the horizontal exit.

7.2.4.3.3 Fire barriers forming horizontal exits shall not be penetrated by ducts, unless such ducts are existing penetrations protected by approved and listed fire dampers.

Exception No. 1: This requirement shall not apply to buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

Exception No. 2: This requirement shall not apply to duct penetrations permitted in Chapters 22 and 23 and protected by combination fire dampers/smoke leakage-rated dampers that meet the smoke damper actuation requirements of 8.3.5.

7.2.4.3.4 Any opening in such fire barriers shall be protected as provided in 8.2.3.2.3.

7.2.4.3.5 Doors in horizontal exits shall comply with 7.2.1.4, unless they are sliding doors as otherwise provided in Chapters 40 and 42.

7.2.4.3.6 Swinging fire doors shall be permitted in horizontal exits, provided that the criteria of both 7.2.4.3.6(1) and (2), or the criteria of 7.2.4.3.6(1) and (3), are met as follows:

- (1) The doors shall swing in the direction of egress travel.
- (2) Where a horizontal exit serves areas on both sides of a fire barrier, there shall be adjacent openings with swinging doors that open in opposite directions, with signs on each side of the fire barrier identifying the door that swings with the travel from that side.

Exception: Sleeping room areas in detention and correctional occupancies shall be exempt from the sign requirement.

- (3) The doors shall be of any other approved arrangement, provided that the doors always swing with any possible egress travel.

Exception No. 1: The requirements of 7.2.4.3.6 shall not apply to horizontal exit door swing as provided in Chapters 19 and 23.

Exception No. 2: The requirements of 7.2.4.3.6 shall not apply to horizontal exit doors in corridors no greater than 6 ft (1.8 m) wide in existing buildings.

7.2.4.3.7* Doors in horizontal exits shall be designed and installed to minimize air leakage.

7.2.4.3.8* All fire doors in horizontal exits shall be self-closing or automatic-closing in accordance with 7.2.1.8. Horizontal exit doors located across a corridor shall be automatic-closing in accordance with 7.2.1.8.

Exception: Where approved by the authority having jurisdiction, existing cross-corridor doors in horizontal exits shall be permitted to be self-closing.

7.2.4.4 Bridges and Balconies.

7.2.4.4.1 Each bridge or balcony used in conjunction with horizontal exits shall have guards and handrails in conformity with the requirements of 7.2.2.4.

7.2.4.4.2 Every bridge or balcony shall be not less than the width of the door to which it leads and shall be not less than 44 in. (112 cm) wide for new construction.

7.2.4.4.3 Where the bridge or balcony serves as a horizontal exit in one direction, the door shall be required to swing only in the direction of egress travel.

Exception: This requirement shall not apply to horizontal exit door swing as provided in Chapters 19 and 23.

7.2.4.4.4 Where the bridge or balcony serves as a horizontal exit in both directions, doors shall be provided in pairs that swing in opposite directions. Only the door swinging in the direction of egress travel shall be included in the determination of egress capacity.

Exception No. 1: This requirement shall not apply if the bridge or balcony has sufficient floor area to accommodate the occupant load of either connected building or fire area on the basis of 3 ft² (0.28 m²) per person.

Exception No. 2: In existing buildings, doors on both ends of the bridge or balcony shall be permitted to swing out from the building where approved by the authority having jurisdiction.

Exception No. 3: This requirement shall not apply to horizontal exit door swing as provided in Chapters 19 and 23.

7.2.4.4.5 In climates subject to the accumulation of snow and ice, the bridge or balcony floor shall be protected to prevent the accumulation of snow and ice.

Exception: In existing buildings, one step, not to exceed 8 in. (20.3 cm), shall be permitted below the level of the inside floor.

7.2.4.4.6 In both of the connected buildings or fire areas, all wall openings, any part of which is within 10 ft (3 m) of any bridge or balcony, as measured horizontally or below, shall be protected with fire doors or fixed fire window assemblies having a 3/4-hour fire protection rating.

Exception: This requirement shall not apply to existing bridges and balconies where approved by the authority having jurisdiction.

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 this subsection.

7.2.5.2 Dimensional Criteria. Ramps shall be in accordance with the following:

- (1) New ramps shall be in accordance with Table 7.2.5.2(a).

Table 7.2.5.2(a) New Ramps

Minimum width clear of all obstructions, except projections not more than 3 1/2 in. (8.9 cm) at or below handrail height on each side	44 in. (112 cm)
Maximum slope	1 in 12
Maximum cross slope	1 in 48
Maximum rise for a single ramp run	30 in. (76 cm)

Exception No. 1: The maximum slope requirement shall not apply to ramps as otherwise provided in Chapter 12.

Exception No. 2: The requirement of 7.2.5.2(1) shall not apply to industrial equipment access areas as otherwise provided in Chapter 40.

Exception No. 3: Ramps providing access to vehicles, vessels, mobile structures, and aircraft shall not be required to comply with the maximum slope or maximum rise for a single ramp run.

- (2) Existing ramps shall be permitted to remain in use or be rebuilt, provided that they meet the requirements shown in Table 7.2.5.2(b).

Table 7.2.5.2(b) Existing Ramps

Feature	Class A	Class B
Minimum width	44 in. (122 cm)	30 in. (76 cm)
Maximum slope	1 in 10	1 in 8
Maximum height between landings	12 ft (3.7 m)	12 ft (3.7 m)

Exception No. 1: Existing Class B ramps with slopes not steeper than 1 in 6 shall be permitted to remain in use where approved by the authority having jurisdiction.

Exception No. 2: Existing ramps with slopes not steeper than 1 in 10 shall not be required to be provided with landings.

Exception No. 3: The requirement of 7.2.5.2(2) shall not apply to industrial equipment access areas as otherwise provided in Chapter 40.

Exception No. 4: Ramps providing access to vehicles, vessels, mobile structures, and aircraft shall not be required to comply with the maximum slope or maximum rise for a single ramp run.

7.2.5.3 Ramp Details.

7.2.5.3.1 Construction. Ramp construction shall be as follows.

(a) All ramps serving as required means of egress shall be of permanent fixed construction.

(b) Each ramp in buildings required by this Code to be of Type I or Type II construction shall be noncombustible or limited-combustible throughout. The ramp floor and landings shall be solid and without perforations.

7.2.5.3.2 Landings. Ramp landings shall be as follows.

(a) Ramps shall have landings located at the top, at the bottom, and at doors opening onto the ramp. The slope of the landing shall not be steeper than 1 in 48. Every landing shall have a width not less than the width of the ramp. Every landing shall be not less than 60 in. (152 cm) long in the direction of travel.

Exception: The minimum 60-in. (152-cm) length requirement shall not apply to existing approved landings.

(b) Any changes in travel direction shall be made only at landings. Ramps and intermediate landings shall continue with no decrease in width along the direction of egress travel.

Exception: Existing ramps shall be permitted to change direction without a landing.

7.2.5.3.3 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. (10.1 cm) in height.

7.2.5.4 Guards and Handrails. Guards complying with 7.2.2.4 shall be provided for ramps. Handrails complying with 7.2.2.4 shall be provided along both sides of a ramp run with a rise greater than 6 in. (15.2 cm). The height of handrails and guards shall be measured vertically to the top of the guard or rail from the walking surface adjacent thereto.

Exception: This requirement shall not apply to guards and handrails provided for ramped aisles in accordance with Chapters 12 and 13.

7.2.5.5 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. The use of Exception Nos. 2 and 3 to 7.2.2.6.3 shall be prohibited.

7.2.5.6 Special Provisions for Outside Ramps.

7.2.5.6.1* Visual Protection. Outside ramps shall be arranged to avoid any impediments to their use by persons having a fear of high places. For ramps more than three stories in height, any arrangement intended to meet this requirement shall be at least 4 ft (122 cm) in height.

7.2.5.6.2* 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 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.

Exception No. 1: Fire windows in accordance with 8.2.3.2.2 shall be permitted to be installed in such a separation in a building protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

Exception No. 2: Existing fixed wired glass panels in steel sash shall be permitted to be continued in use in such a 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. The width of an exit passageway shall be adequate to accommodate the aggregate required capacity of all exits that discharge through it.

Exception No. 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.*

Exception No. 2: As provided in Chapters 36 and 37, an exit passageway in a covered mall building shall be permitted to accommodate occupant loads independently from the covered mall and the tenant spaces. (See the exception to 36.2.2.7 and the exception to 37.2.2.7.)

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 escalators and moving walks in existing buildings.

7.2.8 Fire Escape Stairs.

7.2.8.1 General.

7.2.8.1.1 Fire escape stairs shall comply with the provisions of 7.2.8, unless they are existing fire escape stairs approved by the authority having jurisdiction.

7.2.8.1.2 Fire escape stairs shall not constitute any of the required means of egress.

Exception No. 1: Fire escape stairs shall be permitted on existing buildings as provided in Chapters 11 through 42 but shall not constitute more than 50 percent of the required means of egress.

Exception No. 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). New fire escape stairs 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. 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.

(a) *Horizontally.* Within 15 ft (4.5 m) of any balcony, platform, or stairway constituting a component of the fire escape stair.

(b) *Below.* Within three stories or 35 ft (10 m) of any balcony, platform, walkway, or stairway constituting a component of the fire escape stair, or within two stories or 20 ft (6 m) of a platform or walkway leading from any story to the fire escape stair.

(c) *Above.* Within 10 ft (3 m) of any balcony, platform, or walkway, as measured vertically, or within 10 ft (3 m) of any stair tread surface, as measured vertically.

(d) *Top Story.* Where stairs do not lead to the roof, no wall opening protection required.

(e) *Court.* 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 ground.

(f) *Alcove.* Facing an alcove served by a fire escape stair where the width of the alcove does not exceed one-third, or the depth does not exceed one-fourth, of the height to the uppermost platform of the fire escape stair, measured from the ground.

Exception No. 1: The provisions of 7.2.8.2 shall be permitted to be modified by the authority having jurisdiction in consideration of automatic sprinkler protection, low hazard occupancy, or other special conditions.

Exception No. 2: The provisions of 7.2.8.2 that require the protection of window openings shall not be required where such window opening is 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 7.5.1.2.

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.

Exception: If the 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 provided for access to the roof.

7.2.8.3.4 Access to a fire escape stair shall be directly to a balcony, landing, or platform and shall not exceed the floor or windowsill level and shall not be more than 8 in. (20.3 cm) below the floor level or 18 in. (45.7 cm) below the windowsill.

7.2.8.4 Stair Details.

7.2.8.4.1 General. Fire escape stairs shall comply with the requirements of Table 7.2.8.4.1(a). Replacement of fire escape stairs shall comply with the requirements of Table 7.2.8.4.1(b).

Table 7.2.8.4.1(a) Fire Escape Stairs

Feature	Serving More than 10 Occupants	Serving 10 or Fewer Occupants
Minimum widths	22 in. (55.9 cm) clear between rails	18 in. (45.7 cm) clear between rails
Minimum horizontal dimension of any landing or platform	22 in. (55.9 cm) clear	18 in. (45.7 cm) clear
Maximum riser height	9 in. (22.9 cm)	12 in. (30.5 cm)
Minimum tread, exclusive of nosing	9 in. (22.9 cm)	6 in. (15.3 cm)
Minimum nosing or projection	1 in. (2.5 cm)	No requirement
Tread construction	Solid 1/2-in. (1.3-cm) diameter perforations permitted	Flat metal bars on edge or square bars secured against turning, spaced 1 1/4 in. (3.2 cm) 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 (3.7 m)	No requirement
Headroom, minimum	6 ft 8 in. (203 cm)	Same
Access to escape	Door or casement windows, 24 in. × 6 ft 6 in. (61 cm × 198 cm); or double-hung windows, 30 in. × 36 in. (76 cm × 91 cm) clear opening	Windows providing a clear opening of at least 20 in. (50.8 cm) in width, 24 in. (61 cm) in height, and 5.7 ft ² (0.53 m ²) in area
Level of access opening	Not over 12 in. (30.5 cm) above floor; steps if higher	Same
Discharge to ground	Swinging stair section permitted if approved by authority having jurisdiction	Swinging stair, or ladder if approved by authority having jurisdiction
Capacity, number of persons	0.5 in. (1.3 cm) per person, if access by door; 1.0 in. (2.5 cm) per person, if access by climbing over windowsill	10; if winders or ladder from bottom balcony, 5; if both, 1

Table 7.2.8.4.1(b) Replacement Fire Escape Stairs

Feature	Serving More than 10 Occupants	Serving 10 or Fewer Occupants
Minimum widths	22 in. (55.9 cm) clear between rails	Same
Minimum horizontal dimension of any landing or platform	22 in. (55.9 cm)	Same
Maximum riser height	9 in. (22.9 cm)	Same
Minimum tread, exclusive of nosing	10 in. (25.4 cm)	Same
Tread construction	Solid, 1/2-in. (1.3-cm) diameter perforations permitted	Same
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 (3.7 m)	Same
Headroom, minimum	6 ft 8 in. (203 cm)	Same
Access to escape	Door or casement windows, 24 in. × 6 ft 6 in. (61 cm × 198 cm); or double-hung windows, 30 in. × 36 in. (76 cm × 91 cm) clear opening	Windows providing a clear opening of at least 20 in. (50.8 cm) in width, 24 in. (61 cm) in height, and 5.7 ft ² (0.53 m ²) in area
Level of access opening	Not over 12 in. (30.5 cm) above floor; steps if higher	Same
Discharge to ground	Swinging stair section permitted if approved by authority having jurisdiction	Same
Capacity, number of persons	0.5 in. (1.3 cm) per person, if access by door; 1.0 in. (2.5 cm) per person, if access by climbing over windowsill	10

7.2.8.4.2 Slip Resistance. Stair treads and landings of new or replacement fire escape stairs shall have slip-resistant surfaces.

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 stair use by persons having a fear of high places. For stairs more than three stories in height, any arrangement intended to meet this requirement shall be at least 42 in. (107 cm) 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. (10.2 cm).

7.2.8.7.6 If the distance from the lowest platform to ground is not less than 12 ft (3.7 m), an intermediate balcony not more than 12 ft (3.7 m) from the ground and not less than 7 ft (2.1 m) in the clear underneath shall be provided, with width not less than that of the stairs and length not less than 4 ft (1.2 m).

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.

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 7.2.8.3.3
- (2) A second means of egress from storage elevators as permitted in Chapter 42
- (3) A 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) A 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 ground 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 A14.3, *Safety Code for Fixed Ladders*.

Exception No. 1: Existing ladders complying with the edition of this Code that was in effect when the ladders were installed shall be permitted where approved by the authority having jurisdiction.

Exception No. 2: Exception No. 2 Industrial stairs complying with the minimum requirements for fixed stairs of ANSI A1264.1, Safety Requirements for Workplace Floor and Wall Openings, Stairs and Railing 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. (30.5 cm) 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 12 through 42.

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 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.

Exception: This requirement shall not apply where otherwise provided 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 7.2.8.3.3
- (2) A second means of egress from storage elevators as permitted in Chapter 42
- (3) A 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) A 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 the following:

- (1) Handrails shall be provided on both sides of alternating tread devices in accordance with 7.2.2.4.5.
- (2) The clear width between handrails shall be not less than 17 in. (43.2 cm) and not more than 24 in. (61 cm).
- (3) Headroom shall be not less than 6 ft 8 in. (2 m).
- (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 9.5 in. (24.1 cm).
- (6) Treads shall have a projected tread depth of not less than 5.8 in. (14.7 cm), measured in accordance with 7.2.2, with each tread providing 9.5 in. (24.1 cm) of depth, including tread overlap.
- (7) A distance of not less than 6 in. (15.2 cm) shall be provided between the stair handrail and any other object.
- (8) The initial tread of the stair 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. (5.0 cm).
- (10) The occupant load served shall not exceed three.

7.2.12 Areas of Refuge.

7.2.12.1 General. An area of refuge used as part of a required accessible means of egress in accordance with 7.5.4, or used as a part of any required means of egress, shall conform to the following:

- (1) The general requirements of Section 7.1
- (2) The requirements of 7.2.12.2 and 7.2.12.3

Exception: The requirement of 7.2.12.1(2) shall not apply to areas of refuge consisting of stories of buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

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, without requiring return to the building

spaces through which travel to the area of refuge occurred, via an exit or an elevator.

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 not be less than 48 in. (122 cm).

Exception No. 1: The minimum 48-in. (122-cm) 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.).

Exception No. 2: For stairs where egress is in the descending direction, a clear width of not less than 37 in. (94 cm), measured at and below handrail height, shall be permitted if approved alternative measures are provided that do not necessitate carrying occupied wheelchairs on the stairs.

Exception No. 3: Existing stairs and landings that provide a clear width of not less than 37 in. (94 cm), 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, the elevator shall be approved for fire fighter service as provided in Section 211 of ASME/ANSI A17.1, *Safety Code for Elevators and Escalators*. The power supply shall be protected against interruption from fire occurring within the building but outside the area of refuge. The elevator shall be located in a shaft system meeting the requirements for smokeproof enclosures in accordance with 7.2.3.

Exception No. 1: The smokeproof enclosure shall not be required for areas of refuge that are more than 1000 ft² (93 m²) and that are created by a horizontal exit meeting the requirements of 7.2.4.

Exception No. 2: The smokeproof enclosure 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 to the stair enclosure or the elevator door and the associated portion of the area of refuge that the stair enclosure door or elevator door serves shall be identified by signage. (See 7.2.12.3.5.)

7.2.12.2.6* 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. (76 cm × 122 cm) for each 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. (91 cm).

7.2.12.3.2* For any area of refuge that does not exceed 1000 ft² (93 m²), 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 be 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 with not less than a 1-hour fire resistance rating, unless a greater rating is required in other provisions of this *Code*. Such barriers, and any openings in them, shall minimize air leakage and retard the passage of smoke. Doors in such barriers 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 7.2.1.8.2. Ducts shall be permitted to penetrate such barriers, 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.

Exception: Existing barriers with a minimum 30-minute fire resistance rating shall be permitted.

7.2.12.3.5 Each area of refuge shall be identified by a sign stating the following:

AREA OF REFUGE

The sign shall conform to the requirements of CABO/ANSI A117.1, *American National Standard for 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 providing access to the area of refuge
- (2) At all exits not providing an accessible means of egress, as defined in 3.3.2
- (3) Where necessary to indicate clearly the direction to an area of refuge

Signs shall be illuminated as required for exit signs where exit sign illumination is required.

7.2.12.3.6 Tactile signage complying with CABO/ANSI A117.1, *American National Standard for Accessible and Usable Buildings and Facilities*, shall be located at each door to an area of refuge.

7.2.13 Elevators.

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 towers, as defined in 3.3.203, provided that 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 shall be implemented, specifically including the elevator, and staff personnel shall be trained in operations and procedures for elevator emergency use in normal operating mode prior to fire fighter 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 capacity of not less than 50 percent of the occupant load of the area served by the lobby. The capacity shall be calculated by using 3 ft² (0.28 m²) per person and shall also include one wheelchair space of 30 in. × 48 in. (76 cm × 122 cm) for each 50 persons, or fraction thereof, of the total occupant load served by that lobby.

7.2.13.3 Elevator Lobby. On every floor served by the elevator, there shall be an elevator lobby. Barriers forming the elevator lobby shall have a fire resistance rating of not less than 1 hour and shall be arranged as a smoke barrier in accordance with Section 8.3.

7.2.13.4 Elevator Lobby Doors. Elevator lobby doors shall have a fire protection rating of at least 1 hour. The transmitted temperature end point shall not exceed 450°F (250°C) above ambient at the end of 30 minutes of the fire exposure specified in the test method referenced in 8.2.3.2.1(a). Elevator lobby doors shall be self-closing or automatic-closing in accordance with 7.2.1.8.

7.2.13.5 Door Activation. The elevator lobby doors shall close in response to a signal from a smoke detector located directly outside the elevator lobby adjacent to or on each door opening. Closing of lobby doors in response to a signal from the building fire alarm system shall be permitted. Closing of one elevator lobby door by means of smoke detector or a signal from the building fire alarm system shall result in closing of all elevator lobby doors serving that elevator evacuation system.

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 at least 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 at least 1 hour of operation in the event of fire.

7.2.13.9* Elevator Operation. Elevators shall be provided with fire fighter service in accordance with ASME/ANSI A17.1, *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/ANSI A17.1, *Safety Code for Elevators and Escalators*.

7.2.13.12 Signage. Signage shall comply with 7.10.8.2.

SECTION 7.3 CAPACITY OF MEANS OF EGRESS

7.3.1 Occupant Load.

7.3.1.1 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.

7.3.1.2* 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. 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 use for which the net area figure is specified.

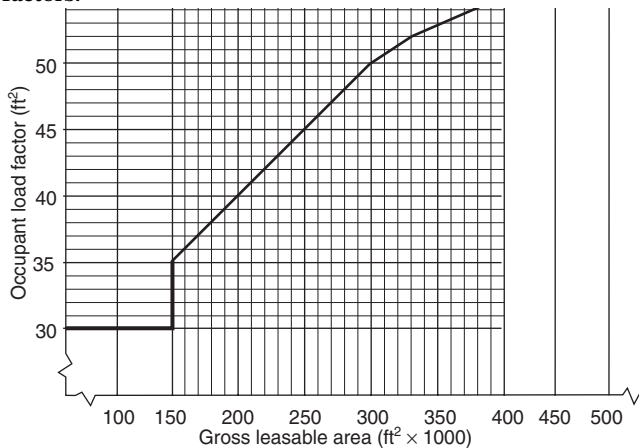
Table 7.3.1.2 Occupant Load Factor

Use	ft ²⁺ (per person)	m ²⁺ (per person)
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/45.7 linear cm
Fixed seating	Number of fixed seats	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 — of water surface	4.6 — of 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
Educational Use		
Classrooms	20 net	1.9 net
Shops, laboratories, vocational rooms	50 net	4.6 net
Day-Care Use		
	35 net	3.3 net
Health Care Use		
Inpatient treatment departments	240	22.3
Sleeping departments	120	11.1

Table 7.3.1.2 Occupant Load Factor

Use	ft ²⁺ (per person)	m ²⁺ (per person)
Detention and Correctional Use	120	11.1
Residential Use		
Hotels and dormitories	200	18.6
Apartment buildings	200	18.6
Board and care, large	200	18.6
Industrial Use		
General and high hazard industrial	100	9.3
Special purpose industrial	NA [‡]	NA [‡]
Business Use		
	100	9.3
Storage Use (other than mercantile storerooms)		
	NA [‡]	NA [‡]
Mercantile Use		
Sales area on street floor [§] [◇]	30	2.8
Sales area on two or more street floors [◇]	40	3.7
Sales area on floor below street floor [◇]	30	2.8
Sales area on floors above street floor [◇]	60	5.6
Floors or portions of floors used only for offices	See business use.	See business use.
Floors or portions of floors used only for storage, receiving, and shipping, and not open to general public	300	27.9
Covered mall buildings	Per factors applicable to use of space [#]	Per factors applicable to use of space [#]

[†]All factors expressed in gross area unless marked "net".
[‡]Not applicable. The occupant load shall be not less than the maximum probable number of occupants present at any time.
[§]For the purpose of determining occupant load in mercantile occupancies where, due to differences in grade of streets on different sides, two or more floors directly accessible from streets (not including alleys or similar back streets) exist, each such floor shall be considered a street floor. The occupant load factor shall be one person for each 40 ft² (3.7 m²) of gross floor area of sales space.
[◇]In mercantile occupancies with no street floor, as defined in 3.3.196, but with access directly from the street by stairs or escalators, the principal floor at the point of entrance to the mercantile occupancy shall be considered the street floor.
[#]The portions of the covered mall, where considered a pedestrian way and not used as gross leasable area, shall not be assessed an occupant load based on Table 7.3.1.2. However, means of egress from a covered mall pedestrian way shall be provided for an occupant load determined by dividing the gross leasable area of the covered mall building (not including anchor stores) by the appropriate lowest whole number occupant load factor from Figure 7.3.1.2.
 Each individual tenant space shall have means of egress to the outside or to the covered mall based on occupant loads figured by using the appropriate occupant load factor from Table 7.3.1.2.
 Each individual anchor store shall have means of egress independent of the covered mall.

FIGURE 7.3.1.2 Covered mall buildings occupant load factors.

Note: For SI units, $1\text{ft}^2 = 0.093\text{ m}^2$.

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 Where exits serve more than one story, only the occupant load of each story considered individually shall be used in computing the required capacity of the exits at that story, provided that the required egress capacity of the exit is not decreased in the direction of egress travel.

7.3.1.5 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 capacity of the two means of egress.

7.3.1.6 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. The width of means of egress shall be measured in the clear at the narrowest point of the exit component under consideration.

Exception: Projections not more than $3\frac{1}{2}$ in. (8.9 cm) on each side shall be permitted at 38 in. (96 cm) and below.

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.

7.3.3.2 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.

Table 7.3.3.1 Capacity Factors

Area	Stairways (width per person)		Level Components and Ramps (width per person)	
	in.	cm	in.	cm
Board and care	0.4	1.0	0.2	0.5
Health care, sprinklered	0.3	0.8	0.2	0.5
Health care, nonsprinklered	0.6	1.5	0.5	1.3
High hazard contents	0.7	1.8	0.4	1.0
All others	0.3	0.8	0.2	0.5

7.3.4 Minimum Width.

7.3.4.1 The width of any means of egress shall be not less than that required for a given egress component in Chapter 7 or Chapters 12 through 42, and shall be not less than 36 in. (91 cm).

*Exception No. 1:** The width of exit access formed by furniture and movable partitions, serving not more than six people and having a length not exceeding 50 ft (15 m), shall be not less than 18 in. (45.7 cm) at and below a height of 38 in. (96 cm), or 28 in. (71 cm) above a height of 38 in. (96 cm), provided that widths not less than 36 in. (91 cm) for new exit access and 28 in. (71 cm) for existing exit access are provided without moving permanent walls.

Exception No. 2: This requirement shall not apply to doors as otherwise provided for in 7.2.1.2.

Exception No. 3: In existing buildings, the width shall be permitted to be not less than 28 in. (71 cm).

Exception No. 4: This requirement shall not apply to aisles and aisle accessways as otherwise provided in Chapters 12 and 13.

Exception No. 5: This requirement shall not apply to industrial equipment access as otherwise provided in Chapter 40.

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

SECTION 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.

Exception No. 1: This requirement shall not apply where a single means of egress is permitted in Chapters 11 through 42.

Exception No. 2: A mezzanine or balcony shall be permitted to have a single means of egress, provided that the common path of travel limitations of Chapters 12 through 42 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 12 through 42, 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, not utilizing 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, tool, special knowledge, or special effort, shall be prohibited at the point of access to an elevator car.

7.4.1.6 Elevator lobbies shall have access to at least one exit. Such exit access shall not require the use of a key, tool, special knowledge, or special effort.

SECTION 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.

7.5.1.2* Where exits are not immediately accessible from an open floor area, continuous passageways, aisles, or corridors leading directly to every exit shall be maintained and shall be arranged to provide access for each occupant to not less than two exits by separate ways of travel. Exit access corridors shall provide access to not less than two approved exits without passing through any intervening rooms other than corridors, lobbies, and other spaces permitted to be open to the corridor.

Exception No. 1: This requirement shall not apply where a single exit is permitted in Chapters 12 through 42.

Exception No. 2: Where common paths of travel are permitted for an occupancy in Chapters 12 through 42, such common paths of travel shall be permitted but shall not exceed the limit specified.

Exception No. 3: Existing corridors that require passage through a room to access an exit shall be permitted to continue to be used, provided that the following criteria are met:

(a) Such arrangement is approved by the authority having jurisdiction.

(b) The path of travel is marked in accordance with Section 7.10.

(c) Doors to such rooms comply with 7.2.1.

(d) Such arrangement is not prohibited by the occupancy chapter.

Exception No. 4: Corridors that are not required to be fire resistance rated shall be permitted to discharge into open floor plan areas.

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

7.5.1.4* Where two exits or exit access doors are required, they shall be placed 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 exit doors or exit access doors. Where exit enclosures are provided as the required exits 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.

Where more than two exits or exit access doors are required, at least two of the required exits or exit access doors shall be arranged to comply with the minimum separation distance requirement. The other exits or exit access doors shall be located so that if one becomes blocked, the others shall be available.

Exception No. 1: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, the minimum separation distance between two exits or exit access doors measured in accordance with 7.5.1.4 shall be not less than one-third the length of the maximum overall diagonal dimension of the building or area to be served.

Exception No. 2: In existing buildings, where more than one exit or exit access door is required, such exits or exit access doors shall be permitted to be remotely located in accordance with 7.5.1.3.

7.5.1.5* Interlocking or scissor stairs shall be permitted to be considered separate exits if enclosed in accordance with 7.1.3.2 and separated from each other by 2-hour fire resistance-rated noncombustible construction. There shall be no penetrations or communicating openings, whether protected or not, between the stair enclosures.

7.5.1.6* Exit access shall be arranged so that there are no dead ends in corridors, unless permitted by and limited to the length specified in Chapters 12 through 42.

7.5.1.7 Exit access from rooms or spaces shall be permitted to be through adjoining or intervening rooms or areas, provided that such adjoining rooms 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 42.

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, store-rooms other than as provided in Chapters 36 and 37, restrooms, workrooms, 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 Chapters 18, 19, 22, and 23.

7.5.2.2* Exit access and exit doors shall be designed and arranged to be clearly recognizable. Hangings or draperies shall not be placed over exit doors or located to conceal or obscure any exit. Mirrors shall not be placed on exit doors. Mirrors shall not be placed in or adjacent to any exit in such a manner as to confuse the direction of exit.

Exception: Curtains shall be permitted across means of egress openings in tent walls if the following criteria are met:

(a) They are distinctly marked in contrast to the tent wall so as to be recognizable as means of egress.

(b) They are installed across an opening that is at least 6 ft (1.8 m) in width.

(c) 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 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 are accessed without any occupant needing to travel past an unprotected opening to reach one of the stairs, or where dead ends on the exterior exit access do not exceed 20 ft (6.1 m).

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 42.

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. Access shall be provided to not less than one accessible area of refuge or one accessible exit providing an accessible route to an exit discharge and shall remain within the allowable travel distance.

Exception No. 1: Exit access travel along the accessible means of egress shall be permitted to be common for the distances permitted as common paths of travel.

Exception No. 2: A single accessible means of egress shall be permitted from buildings or areas of buildings permitted to have a single exit.

Exception No. 3: This requirement shall not apply to health care occupancies protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

7.5.4.2 If two accessible means of egress are required, the exits serving these paths shall be placed 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 exit doors or exit access doors. Where exit enclosures are provided as the required exits 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.

Exception No. 1: This requirement shall not apply to buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

Exception No. 2: This requirement 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 7.2.12.2.3 and shall either 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 8.3 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.

SECTION 7.6 MEASUREMENT OF TRAVEL DISTANCE TO EXITS

7.6.1* The travel distance in any occupied space to not less than one exit, measured in accordance with 7.6.2 through 7.6.5, shall not exceed the limits specified in this Code. (See 7.6.4.)

7.6.2* The travel distance to an exit shall be measured on the floor or other walking surface along the centerline of the natural path of travel, starting from the most remote point subject to occupancy, curving around any corners or obstructions with a 1-ft (0.3-m) clearance therefrom, and ending at the center of the doorway or other point at which the exit begins. Where measurement includes stairs, the measurement shall be taken in the plane of the tread nosing.

Exception: Travel distance measurement shall be permitted to terminate at a smoke barrier as provided in Chapter 23.

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 Travel distance limitations shall be as provided in Chapters 11 through 42 and, for high hazard areas, shall be in accordance with Section 7.11.

7.6.5 Where any part of an exterior exit is within 10 ft (3 m) of horizontal distance of any unprotected building opening, as permitted by an exception to 7.2.2.6.3 for outside stairs, the travel distance to the exit shall include the length of travel to ground level.

SECTION 7.7 DISCHARGE FROM EXITS

7.7.1* Exits shall terminate directly at a public way or at an exterior exit discharge. Yards, courts, open spaces, or other portions of the exit discharge shall be of required width and size to provide all occupants with a safe access to a public way.

Exception No. 1: This requirement shall not apply to interior exit discharge as otherwise provided in 7.7.2.

Exception No. 2: This requirement shall not apply to rooftop exit discharge as otherwise provided in 7.7.6.

Exception No. 3: Means of egress shall be permitted to terminate in an exterior area of refuge as provided in Chapters 22 and 23.

7.7.2 Not more than 50 percent of the required number of exits, and not more than 50 percent of the required egress capacity, shall be permitted to discharge through areas on the level of exit discharge, provided that the criteria of 7.7.2(1) through (3) are met:

- (1) Such discharge shall lead to a free and unobstructed way to the exterior of the building, and such way is readily visible and identifiable from the point of discharge from the exit.
- (2) 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 this purpose 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 a fire resistance rating meeting the requirements for the enclosure of exits (see 7.1.3.2.1).

Exception: The requirement of 7.7.2(2) shall not apply where the discharge area is a vestibule or foyer meeting all of the following:

(a) The depth from the exterior of the building shall not be more than 10 ft (3 m) and the length shall not be more than 30 ft (9.1 m).

(b) The foyer shall be separated from the remainder of the level of discharge by construction providing protection not less than the equivalent of wired glass in steel frames.

(c) The foyer shall serve only as means of egress and shall include an exit directly to the outside.

(3) 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.

Exception No. 1: Levels below the level of discharge shall be permitted to be open to the level of discharge in an atrium in accordance with 8.2.5.6.

Exception No. 2: One hundred percent of the exits shall be permitted to discharge through areas on the level of exit discharge as provided in Chapters 22 and 23.

Exception No. 3: 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.

7.7.3 The exit discharge shall be arranged and marked to make clear the direction of egress to a public way. Stairs shall be arranged so as to make clear the direction of egress to a public way. Stairs that continue more than one-half story beyond the level of exit discharge shall be interrupted at the level of exit discharge by partitions, doors, or other effective means.

7.7.4 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 and 7.2.2.5.5.)

7.7.6 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 the following criteria are met:

- (1) The roof construction has a fire resistance rating not less than that required for the exit enclosure.
- (2) There is a continuous and safe means of egress from the roof.

SECTION 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 42. 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 exit 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. Artificial lighting shall be employed at such locations and for such periods of time as required to maintain the illumination to the minimum criteria values herein specified.

Exception: Automatic, motion sensor-type lighting switches shall be permitted within the means of egress, provided that the switch controllers are equipped for fail-safe operation, the illumination timers are set for a minimum 15-minute duration, and the motion sensor is activated by any occupant movement in the area served by the lighting units.

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 to values of at least 1 ft-candle (10 lux) measured at the floor.

Exception No. 1: In assembly occupancies, the illumination of the floors of exit access shall be at least 0.2 ft-candle (2 lux) during periods of performances or projections involving directed light.

*Exception No. 2:** This requirement 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 ft-candle (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.

SECTION 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 42
- (2) Underground and windowless 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) The stair shaft and vestibule of smokeproof enclosures, which shall be permitted to include a standby generator that is installed for the smokeproof enclosure mechanical ventilation equipment and used for the stair shaft and vestibule emergency lighting power supply

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, ramps, aisles, walkways, and escalators leading to a public way.

7.9.1.2 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 not less than 1¹/₂ hours in the event of failure of normal lighting. Emergency lighting facilities shall be arranged to provide initial illumination that is not less than an average of 1 ft-candle (10 lux) and, at any point, not less than 0.1 ft-candle (1 lux), measured along the path of egress at floor level. Illumination levels shall be permitted to decline to not less than an average of 0.6 ft-candle (6 lux) and, at any point, not less than 0.06 ft-candle (0.6 lux) at the end of the 1¹/₂ hours. A maximum-to-minimum illumination uniformity ratio of 40 to 1 shall not be exceeded.

7.9.2.2* The emergency lighting system shall be arranged to provide the required illumination automatically in the event of any of the following:

- (1) Interruption of normal lighting such as any 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

7.9.2.3 Emergency generators providing power to emergency lighting systems shall be installed, tested, and maintained in accordance with NFPA 110, *Standard for Emergency and Standby Power Systems*. Stored electrical energy systems, where required in this Code, shall be installed and tested in accordance with NFPA 111, *Standard on Stored Electrical Energy Emergency and Standby Power Systems*.

7.9.2.4* 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, *National Electrical Code*[®].

7.9.2.5 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. A functional test shall be conducted on every required emergency lighting system at 30-day intervals for not less than 30 seconds. An annual test shall be conducted on every required battery-powered emergency lighting system for not less than 1¹/₂ hours. Equipment shall be fully operational for the duration of the test. Written records of visual inspections and tests shall be kept by the owner for inspection by the authority having jurisdiction.

Exception: Self-testing/self-diagnostic, battery-operated emergency lighting equipment that automatically performs a test for not less than 30 seconds and diagnostic routine not less than once every 30 days and indicates failures by a status indicator shall be exempt from the 30-day functional test, provided that a visual inspection is performed at 30-day intervals.

SECTION 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 42.

7.10.1.2* Exits. Exits, other than main exterior exit doors that obviously and clearly are identifiable as exits, shall be marked by an approved sign readily visible from any direction of exit access.

7.10.1.3 Exit Stair Door Tactile Signage. Tactile signage shall be located at each door into an exit stair enclosure, and such signage shall read as follows:

EXIT

Signage shall comply with CABO/ANSI A117.1, *American National Standard for Accessible and Usable Buildings and Facilities*, and shall be installed adjacent to the latch side of the door 60 in. (152 cm) above the finished floor to the centerline of the sign.

Exception: This requirement shall not apply to existing buildings, provided that the occupancy classification does not change.

7.10.1.4* Exit Access. 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. Sign placement shall be such that no point in an exit access corridor is in excess of 100 ft (30 m) from the nearest externally illuminated sign and is not in excess of the marked rating for internally illuminated signs.

Exception: Signs in exit access corridors in existing buildings shall not be required to meet the placement distance requirements.

7.10.1.5* Floor Proximity Exit Signs. Where floor proximity exit signs are required in Chapters 11 through 42, signs shall be placed near the floor level in addition to those signs required for doors or corridors. These signs shall be illuminated in accordance with 7.10.5. Externally illuminated signs shall be sized in accordance with 7.10.6.1. The bottom of the sign shall be not less than 6 in. (15.2 cm) but not more than 8 in. (20.3 cm) 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. (10.2 cm) of the door frame.

7.10.1.6* Floor Proximity Egress Path Marking. Where floor proximity egress path marking is required in Chapters 11 through 42, a listed and approved floor proximity egress path marking system that is internally illuminated shall be installed within 8 in. (20.3 cm) of the floor. 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.

7.10.1.7* 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.

7.10.2* Directional Signs. 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.

7.10.3* Sign Legend. Signs required by 7.10.1 and 7.10.2 shall have the word EXIT or other appropriate wording in plainly legible letters.

7.10.4* Power Source. Where emergency lighting facilities are required by the applicable provisions of Chapters 11 through 42 for individual occupancies, the signs, other than approved self-luminous signs, 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 or 7.10.1.4, 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. Every sign required to be illuminated by 7.10.6.3 and 7.10.7 shall be continuously illuminated as required under the provisions of Section 7.8.

*Exception:** 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. Externally illuminated signs required by 7.10.1 and 7.10.2, other than approved existing signs, shall have the word EXIT or other appropriate wording in plainly legible letters not less than 6 in. (15.2 cm) high with the principal strokes of letters not less than $\frac{3}{4}$ in. (1.9 cm) wide. The word EXIT shall have letters of a width not less than 2 in. (5 cm), except the letter *I*, and the minimum spacing between letters shall be not less than $\frac{3}{8}$ in. (1 cm). Signs larger than the minimum established in this paragraph shall have letter widths, strokes, and spacing in proportion to their height.

Exception No. 1: This requirement shall not apply to existing signs having the required wording in plainly legible letters not less than 4 in. (10.2 cm) high.

Exception No. 2: This requirement shall not apply to marking required by 7.10.1.3 and 7.10.1.5.

7.10.6.2* Size and Location of Directional Indicator. The directional indicator shall be located outside of the EXIT legend, not less than $\frac{3}{8}$ in. (1 cm) from any letter. The directional indicator shall be of a chevron type, as shown in Figure 7.10.6.2. The directional indicator shall be identifiable as a directional indicator at a distance of 40 ft (12.2 m). A directional indicator larger than the minimum established in this paragraph shall be proportionately increased in height, width and stroke. The directional indicator shall be located at the end of the sign for the direction indicated.

Exception: This requirement shall not apply to approved existing signs.

FIGURE 7.10.6.2 Chevron-type indicator.



7.10.6.3* Level of Illumination. Externally illuminated signs shall be illuminated by not less than 5 ft-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, other than approved existing signs, or existing signs having the required wording in legible letters not less than 4 in. (10.2 cm) high, shall be listed in accordance with UL 924, *Standard for Safety Emergency Lighting and Power Equipment*.

Exception: This requirement shall not apply to signs that are in accordance with 7.10.1.3 and 7.10.1.5.

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* No Exit. 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

Such sign shall have the word NO in letters 2 in. (5 cm) high with a stroke width of $\frac{3}{8}$ in. (1 cm) and the word EXIT in letters 1 in. (2.5 cm) high, with the word EXIT below the word NO.

Exception: This requirement shall not apply to approved existing signs.

7.10.8.2 Elevator Signs. Elevators that are a part of a means of egress (see 7.2.13.1) shall have the following signs, with minimum letter height of $\frac{5}{8}$ in. (1.6 cm), 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

7.10.9 Testing and Maintenance.

7.10.9.1 Inspection. Exit signs shall be visually inspected for operation of the illumination sources at intervals not to exceed 30 days.

7.10.9.2 Testing. 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.

SECTION 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 permit 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 7.6.2.

Exception: This requirement shall not apply to storage occupancies as otherwise provided in Chapter 42.

7.11.2 Egress capacity for high hazard contents areas shall be based on 0.7 in./person (1.8 cm/person) for stairs or 0.4 in./person (1.0 cm/person) for level components and ramps in accordance with 7.3.3.1.

7.11.3 Not less than two means of egress shall be provided from each building or hazardous area thereof, unless rooms or spaces do not exceed 200 ft² (18.6 m²), have an occupant load not exceeding three persons, and have a travel distance to the room door not exceeding 25 ft (7.6 m).

7.11.4 Means of egress, for other than rooms or spaces that do not exceed 200 ft² (18.6 m²), have an occupant load not exceeding three persons, and have a travel distance to the room door not exceeding 25 ft (7.6 m), shall be arranged so that there are no dead ends in corridors.

7.11.5 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.

SECTION 7.12 MECHANICAL EQUIPMENT ROOMS, BOILER ROOMS, AND FURNACE ROOMS

7.12.1 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).

Exception No. 1: A common path of travel not exceeding 100 ft (30 m) shall be permitted in 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*

Exception No. 2: In an existing building, a common path of travel not exceeding 150 ft (45 m) shall be permitted if 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.*

Exception No. 3: This requirement 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.

7.12.2 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 7.12.1.

Chapter 8 FEATURES OF FIRE PROTECTION

SECTION 8.1 GENERAL

8.1.1 Application. The features of fire protection set forth in this chapter apply to both new construction and existing buildings.

SECTION 8.2 CONSTRUCTION AND COMPARTMENTATION

8.2.1* Construction. Buildings or structures occupied or used in accordance with the individual occupancy chapters (Chapters 12 through 42) shall meet the minimum construction requirements of those chapters. NFPA 220, *Standard on Types of Building Construction*, shall be used to determine the requirements for the construction classification. 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 either of the following:

- (1) Separate buildings if a 2-hour or greater vertically-aligned fire barrier wall in accordance with NFPA 221, *Standard for Fire Walls and Fire Barrier Walls*, exists between the portions of the building

Exception: The requirement of 8.2.1(1) shall not apply to previously approved separations between buildings.

- (2) The least fire-resistive type of construction of the connected portions, if no such separation is provided

8.2.2 Compartmentation.

8.2.2.1 Where required by Chapters 12 through 42, 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 are continuous from outside wall to outside wall, 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. Walls used as fire barriers shall comply with Chapter 3 of NFPA 221, *Standard for Fire Walls and Fire Barrier Walls*. The NFPA 221 limitation on percentage width of openings shall not apply.

Exception: A fire 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 has a fire resistance rating not less than that of the fire barrier.

8.2.3 Fire Barriers.

8.2.3.1 Fire Resistance-Rated Assemblies.

8.2.3.1.1 Floor-ceiling assemblies and walls used as fire barriers, including supporting construction, shall be of a design that has been tested to meet the conditions of acceptance of NFPA 251, *Standard Methods of Tests of Fire Endurance of Building Construction and Materials*. Fire barriers shall be continuous in accordance with 8.2.2.2.

Exception No. 1: Structural elements shall be required to have only the fire resistance rating required for the construction classification of the building where such elements support nonbearing wall or partition assemblies having a required fire resistance rating of 1 hour or less and where such elements do not serve as exit enclosures or protection for vertical openings.

Exception No. 2: This requirement shall not apply to assemblies calculated to have equivalent fire resistance, provided that the calcula-*

tions are based on the conditions of acceptance and the fire exposure specified in NFPA 251, Standard Methods of Tests of Fire Endurance of Building Construction and Materials.

Exception No. 3: This requirement shall not apply to structural elements supporting floor assemblies in accordance with the exception to 18.1.6.2.

8.2.3.1.2 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) 2-hour fire resistance rating
- (2) 1-hour fire resistance rating
- (3) ^{*1}/₂-hour fire resistance rating

8.2.3.2 Fire Protection-Rated Opening Protectives.

8.2.3.2.1 Door assemblies in fire barriers shall be of an approved type with the appropriate fire protection rating for the location in which they are installed and shall comply with the following.

(a) *Fire doors shall be installed in accordance with NFPA 80, *Standard for Fire Doors and Fire Windows*. Fire doors shall be of a design that has been tested to meet the conditions of acceptance of NFPA 252, *Standard Methods of Fire Tests of Door Assemblies*.

Exception: The requirement of 8.2.3.2.1(a) shall not apply where otherwise specified by 8.2.3.2.3.1.

(b) Fire doors shall be self-closing or automatic-closing in accordance with 7.2.1.8 and, where used within the means of egress, shall comply with the provisions of 7.2.1.

8.2.3.2.2 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. Fire windows shall be installed in accordance with NFPA 80, *Standard for Fire Doors and Fire Windows*, and shall comply with the following:

- (1) *Fire windows used in fire barriers, other than existing fire window installations of wired glass and other fire-rated glazing material in approved metal frames, shall be of a design that has been tested to meet the conditions of acceptance of NFPA 257, *Standard on Fire Test for Window and Glass Block Assemblies*.
- (2) Fire windows used in fire barriers, other than existing fire window installations of wired glass and other fire-rated glazing material in approved metal frames, shall not exceed 25 percent of the area of the fire barrier in which they are used.

Exception: Fire-rated glazing material shall be permitted to be installed in approved existing frames.

8.2.3.2.3* Opening Protectives.

8.2.3.2.3.1 Every opening in a fire barrier shall be protected to limit the spread of fire and restrict the movement of smoke from one side of the fire barrier to the other. The fire protection rating for opening protectives shall be as follows:

- (1) 2-hour fire barrier — 1¹/₂-hour fire protection rating
- (2) 1-hour fire barrier — 1-hour fire protection rating where used for vertical openings or exit enclosures, or ³/₄-hour fire protection rating where used for other than vertical openings or exit enclosures, unless a lesser fire protection rating is specified by Chapter 7 or Chapters 11 through 42

Exception No. 1: Where the fire barrier specified in 8.2.3.2.3.1(2) is provided as a result of a requirement that corridor walls or smoke barriers be of 1-hour fire resistance-rated construction, the opening protectives shall be permitted to have not less than a 20-minute fire protection rating when tested in accordance with NFPA 252, Standard Methods of Fire Tests of Door Assemblies, without the hose stream test.

Exception No. 2: The requirement of 8.2.3.2.3.1(2) shall not apply where special requirements for doors in 1-hour fire resistance-rated corridor walls and 1-hour fire resistance-rated smoke barriers are specified in Chapters 18 through 21.

Exception No. 3: Existing doors having a $3/4$ -hour fire protection rating shall be permitted to continue to be used in vertical openings and in exit enclosures in lieu of the 1-hour rating required by 8.2.3.2.3.1(2).

(3) $1/2$ -hour fire barrier — 20-minute fire protection rating

Exception: Twenty-minute fire protection-rated doors shall be exempt from the hose stream test of NFPA 252, Standard Methods of Fire Tests of Door Assemblies.

8.2.3.2.3.2 Where a 20-minute fire protection-rated door is required in existing buildings, an existing $1\ 3/4$ -in. (4.4-cm) solid, bonded wood-core door, or an existing steel-clad (tin-clad) wood door, or an existing solid-core steel door with positive latch and closer shall be permitted.

Exception: This requirement shall not apply where otherwise specified by Chapters 11 through 42.

8.2.3.2.4 Penetrations and Miscellaneous Openings in Fire Barriers.

8.2.3.2.4.1* Openings in fire barriers for air-handling ductwork or air movement shall be protected in accordance with 9.2.1.

8.2.3.2.4.2* Pipes, conduits, bus ducts, cables, wires, air ducts, pneumatic tubes and ducts, and similar building service equipment that pass through fire barriers shall be protected as follows:

- (1) The space between the penetrating item and the fire barrier shall meet one of the following conditions:
 - a. It shall be filled with a material that is capable of maintaining the fire resistance of the fire barrier.
 - b. It shall be protected by an approved device that is designed for the specific purpose.
- (2) Where the penetrating item uses a sleeve to penetrate the fire barrier, the sleeve shall be solidly set in the fire barrier, and the space between the item and the sleeve shall meet one of the following conditions:
 - a. It shall be filled with a material that is capable of maintaining the fire resistance of the fire barrier.
 - b. It shall be protected by an approved device that is designed for the specific purpose.
- (3) *Insulation and coverings for pipes and ducts shall not pass through the fire barrier unless one of the following conditions is met:
 - a. The material shall be capable of maintaining the fire resistance of the fire barrier.
 - b. The material shall be protected by an approved device that is designed for the specific purpose.
- (4) Where designs take transmission of vibration into consideration, any vibration isolation shall meet one of the following conditions:
 - a. It shall be made on either side of the fire barrier.

- b. It shall be made by an approved device that is designed for the specific purpose.

8.2.4 Smoke Partitions.

8.2.4.1 Where required elsewhere in this Code, smoke partitions shall be provided to limit the transfer of smoke.

8.2.4.2 Smoke partitions 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.

*Exception:** Smoke partitions shall be permitted to terminate at the underside of a monolithic or suspended ceiling system where the following conditions are met:

- (a) The ceiling system forms a continuous membrane.
- (b) A smoketight 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.

8.2.4.3 Doors.

8.2.4.3.1 Doors in smoke partitions shall comply with 8.2.4.3.2 through 8.2.4.3.5.

8.2.4.3.2 Doors shall comply with the provisions of 7.2.1.

8.2.4.3.3 Doors shall not include louvers.

8.2.4.3.4* Door clearances shall be in accordance with NFPA 80, Standard for Fire Doors and Fire Windows.

8.2.4.3.5 Doors shall be self-closing or automatic-closing in accordance with 7.2.1.8.

8.2.4.4 Penetrations and Miscellaneous Openings in Smoke Partitions.

8.2.4.4.1 Pipes, conduits, bus ducts, cables, wires, air ducts, pneumatic tubes and ducts, and similar building service equipment that pass through smoke partitions shall be protected as follows:

- (1) The space between the penetrating item and the smoke partition shall meet one of the following conditions:
 - a. It shall be filled with a material that is capable of limiting the transfer of smoke.
 - b. It shall be protected by an approved device that is designed for the specific purpose.
- (2) Where the penetrating item uses a sleeve to penetrate the smoke partition, the sleeve shall be solidly set in the smoke partition, and the space between the item and the sleeve shall meet one of the following conditions:
 - a. It shall be filled with a material that is capable of limiting the transfer of smoke.
 - b. It shall be protected by an approved device that is designed for the specific purpose.
- (3) Where designs take transmission of vibrations into consideration, any vibration isolation shall meet one of the following conditions:
 - a. It shall be made on either side of the smoke partitions.
 - b. It shall be made by an approved device that is designed for the specific purpose.

8.2.4.4.2 Openings located at points where smoke partitions meet the outside walls, other smoke partitions, smoke barriers, or fire barriers of a building shall meet one of the following conditions:

- (1) They shall be filled with a material that is capable of limiting the transfer of smoke.
- (2) They shall be made by an approved device that is designed for the specific purpose.

8.2.4.4.3* Air transfer openings in smoke partitions shall be provided with approved dampers designed to limit the transfer of smoke. Dampers in air transfer openings shall close upon detection of smoke by approved smoke detectors installed in accordance with NFPA 72, *National Fire Alarm Code*.

8.2.5 Vertical Openings.

8.2.5.1 Every floor that separates stories in a building shall be constructed as a smoke barrier to provide a basic degree of compartmentation. (See 3.3.182 for definition of *Smoke Barrier*.)

Exception: This requirement shall not apply where otherwise specified by 8.2.5.5, 8.2.5.6, or Chapters 11 through 42.

8.2.5.2* Openings through floors, such as stairways, hoistways for elevators, dumbwaiters, and inclined and vertical conveyors; shaftways used for light, ventilation, or building services; or expansion joints and seismic joints used to allow structural movements shall be enclosed with fire barrier walls. Such enclosures shall be continuous from floor to floor or floor to roof. Openings shall be protected as appropriate for the fire resistance rating of the barrier.

Exception No. 1: This requirement shall not apply where otherwise specified by 8.2.5.5, 8.2.5.6, 8.2.5.7, or Chapters 11 through 42.

Exception No. 2: This requirement shall not apply to escalators and moving walks protected in accordance with 8.2.5.11.

Exception No. 3:* This requirement shall not apply to expansion or seismic joints designed to prevent the penetration of fire and shown to have a fire resistance rating of not less than the required fire resistance rating of the floor when tested in accordance with ANSI/UL 2079, *Test of Fire Resistance of Building Joint Systems*.

Exception No. 4: Enclosure shall not be required for pneumatic tube conveyors protected in accordance with 8.2.3.2.4.2.

Exception No. 5: This requirement shall not apply to existing mail chutes where one of the following conditions is met:

(a) The cross-sectional area does not exceed 16 in.² (103 cm²).

(b) The building is protected throughout by an approved automatic sprinkler system in accordance with Section 9.7.

8.2.5.3 Vertical openings (shafts) that do not extend to the bottom or the top of the building or structure shall be enclosed at the lowest or highest level of the shaft, respectively, with construction in accordance with 8.2.5.4.

Exception: 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 8.2.5.4 and 8.2.3.2.3.

8.2.5.4* The fire resistance rating for the enclosure of floor openings shall be not less than as follows (see 7.1.3.2.1 for enclosure of exits):

- (1) Enclosures connecting four stories or more in new construction — 2-hour fire barriers
- (2) Other enclosures in new construction — 1-hour fire barriers
- (3) Existing enclosures in existing buildings — 1/2-hour fire barriers

- (4) As specified in Chapter 26 for lodging and rooming houses, in Chapter 28 for new hotels, and in Chapter 30 for new apartment buildings

8.2.5.5 Unless prohibited by Chapters 12 through 42, 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 is open and unobstructed such that a fire in any part of the space will be readily obvious to the occupants of the space prior to the time it becomes an occupant hazard.
- (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.

Exception No. 1: In buildings protected throughout by an approved automatic sprinkler system in accordance with Section 9.7, a smoke barrier in accordance with Section 8.3 shall be permitted to serve as the separation required by 8.2.5.5(4).

Exception No. 2: The requirement of 8.2.5.5(4) shall not apply to fully sprinklered residential housing units of detention and correctional occupancies in accordance with Exception No. 2 to 22.3.1.1 and Exception No. 2 to 23.3.1.1.

- (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 provide for all the occupants of all levels within the communicating space to simultaneously egress the communicating space by considering it as 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.

8.2.5.6* Unless prohibited by Chapters 12 through 42, an atrium shall be permitted, provided that the following conditions are met:

- (1) In other than existing, previously approved atria, atriums are separated from the adjacent spaces by fire barriers with not less than a 1-hour fire resistance rating with opening protectives for corridor walls. (See 8.2.3.2.3.1(2), *Exception No. 1*.)

Exception No. 1: 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 8.2.5.6(5).

Exception No. 2:* Glass walls and inoperable windows shall be permitted in lieu of the fire barriers where automatic sprinklers are spaced along both sides of the glass wall and the inoperable window at intervals not to exceed 6 ft (1.8 m). The automatic sprinklers shall be located at a distance from the glass not to exceed 1 ft (0.3 m) and shall be arranged so that the entire surface of the glass is wet upon operation of the sprinklers. The glass shall be tempered, wired, or laminated glass held in place by a gasket system that allows the glass framing system to deflect without breaking (loading) the glass before the sprinklers oper-

ate. Automatic sprinklers shall not be required on the atrium side of the glass wall and the inoperable windows where there is no walkway or other floor area on the atrium side above the main floor level. Doors in such walls shall be glass or other material that resists the passage of smoke. Doors shall be self-closing or automatic-closing upon detection of smoke.

- (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 space 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 atria, 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 (1.85 m) 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) *In other than existing, previously approved atria, where an engineered smoke control system is installed to meet the requirements of 8.2.5.6(5), the system is independently activated by each of the following:
 - a. The required automatic sprinkler system
 - b. Manual controls that are readily accessible to the fire department

8.2.5.7 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.

8.2.5.8 Where permitted by Chapters 12 through 42, 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 8.2.5.4.
- (3) Such openings shall be separated from corridors.
- (4) *Such openings shall not serve as a required means of egress.

8.2.5.9 Where there are three or fewer elevator cars in a building, they shall be permitted to be located within the same hoistway enclosure. Where there are four elevator cars, they shall be divided in such a manner that not less than two separate hoistway enclosures are provided. Where there are more than four elevator cars, the number of elevator cars located within a single hoistway enclosure shall not exceed four.

Exception: This requirement shall not apply to existing hoistways in existing buildings.

8.2.5.10 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.

8.2.5.11 Any escalators or moving walks serving as a required exit in existing buildings shall be enclosed in the same manner as exit stairways. (See 7.2.7.)

8.2.5.12 Moving walks not constituting an exit and escalators, other than escalators in large open areas such as atriums and enclosed shopping malls, shall have their floor openings enclosed or protected as required for other vertical openings.

*Exception No. 1:** In buildings protected throughout by an approved automatic sprinkler system in accordance with Section 9.7, escalators or moving walk openings shall be permitted to be protected in accordance with the method detailed in NFPA 13, *Standard for the Installation of Sprinkler Systems*, or in accordance with a method approved by the authority having jurisdiction.

Exception No. 2: Escalators shall be permitted to be protected in accordance with 8.2.5.13.

8.2.5.13 In buildings protected throughout by an approved automatic sprinkler system in accordance with Section 9.7, escalators or moving walk openings shall be permitted to be protected by rolling steel shutters appropriate for the fire resistance rating of the vertical opening protected. The shutters shall close automatically and independently of each other upon smoke detection and sprinkler operation. There shall be a manual means of operating and testing the operation of the shutter. The shutters shall be operated not less than once a week to ensure that they remain in proper operating condition. 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. The leading edge shall arrest the progress of a moving shutter and cause it to retract a distance of approximately 6 in. (15.2 cm) upon the application of a force not exceeding 20 lbf (90 N) applied to the surface of the leading edge. The shutter, following this retraction, shall continue to close. The operating mechanism for the rolling shutter shall be provided with standby power complying with the provisions of NFPA 70, *National Electrical Code*.

8.2.6 Mezzanines.

8.2.6.1 General. A mezzanine shall not be included as a story for the purpose of determining the allowable number of stories in a building.

Exception: Multilevel residential housing areas in detention and correctional occupancies in accordance with Chapters 22 and 23 shall be exempt from the provisions of 8.2.6.2 and 8.2.6.3.

8.2.6.2 Area Limitations.

8.2.6.2.1 The aggregate area of mezzanines within a room, other than those located in special purpose industrial occupancies, 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.

8.2.6.2.2 There shall be no limit on the number of mezzanines in a room.

8.2.6.2.3 For purposes of determining the allowable mezzanine area, the area of the mezzanines shall not be included in the area of the room.

8.2.6.3 Openness. All portions of a mezzanine, other than walls not more than 42 in. (107 cm) 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.

Exception: 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.

8.2.7 Concealed Spaces.

8.2.7.1* In new Type III, Type IV, or Type V construction, any concealed space in which materials having a flame spread rating greater than Class A (as defined in Section 10.2) are exposed shall be effectively firestopped or draftstopped as follows:

- (1) Every exterior and interior wall and partition shall be fire-stopped 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 ft² (280 m²).
- (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 ft² (93 m²) for any space between the ceiling and floor and 3000 ft² (280 m²) for any space between the ceiling and roof.

Exception No. 1: This requirement shall not apply where the space is protected throughout by an approved automatic sprinkler system in accordance with Section 9.7.

Exception No. 2: This requirement shall not apply to concealed spaces serving as plenums. (See NFPA 90A, Standard for the Installation of Air-Conditioning and Ventilating Systems.)

8.2.7.2 In every existing building, firestopping and draftstopping shall be provided as required by the provisions of Chapters 12 through 42.

SECTION 8.3 SMOKE BARRIERS

8.3.1* General. Where required by Chapters 12 through 42, smoke barriers shall be provided to subdivide building spaces for the purpose of restricting the movement of smoke.

8.3.2* Continuity. 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 a combination thereof. Such barriers shall be continuous through all concealed spaces, such as those found above a ceiling, including interstitial spaces.

Exception: 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.

8.3.3 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 8.3.4 through 8.3.6.

8.3.4 Doors.

8.3.4.1* Doors in smoke barriers shall close the opening leaving only the minimum clearance necessary for proper operation and shall be without undercuts, louvers, or grilles.

8.3.4.2* Where a fire resistance rating for smoke barriers is specified elsewhere in the Code, openings shall be protected as follows:

- (1) Door opening protectives shall have a fire protection rating of not less than 20 minutes where tested in accordance with NFPA 252, *Standard Methods of Fire Tests of Door*

Assemblies, without the hose stream test, unless otherwise specified by Chapters 12 through 42.

- (2) Fire windows shall comply with 8.2.3.2.2.

Exception: Latching hardware shall not be required on doors in smoke barriers where so indicated by Chapters 12 through 42.

8.3.4.3* 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.

8.3.5 Smoke Dampers.

8.3.5.1 An approved damper designed to resist the passage of smoke shall be provided for each air transfer opening or duct penetration of a required smoke barrier, unless otherwise specifically exempted by Chapters 12 through 42.

Exception No. 1: This requirement shall not apply to ducts or air transfer openings that are part of an engineered smoke control system in accordance with Section 9.3.

Exception No. 2: This requirement shall not apply to ducts where the air continues to move and the air-handling system installed is arranged to prevent recirculation of exhaust or return air under fire emergency conditions.

Exception No. 3: This requirement shall not apply where the air inlet or outlet openings in ducts are limited to a single smoke compartment.

Exception No. 4: This requirement shall not apply where ducts penetrate floors that serve as smoke barriers.

8.3.5.2 Required smoke dampers in ducts penetrating smoke barriers shall close upon detection of smoke by approved smoke detectors in accordance with NFPA 72, *National Fire Alarm Code*.

Exception No. 1: Duct detectors shall not be required where ducts penetrate smoke barriers above the smoke barrier doors and the door release detector actuates the damper.

Exception No. 2: Approved smoke detector installations located within the ducts in existing installations shall be exempt from the requirements of NFPA 72, National Fire Alarm Code.

8.3.5.3 Required smoke dampers in air transfer openings shall close upon detection of smoke by approved smoke detectors in accordance with NFPA 72, *National Fire Alarm Code*.

Exception: Where a duct is provided on one side of the smoke barrier, the smoke detectors on the duct side shall be in accordance with 8.3.5.2.

8.3.6 Penetrations and Miscellaneous Openings in Floors and Smoke Barriers.

8.3.6.1 Pipes, conduits, bus ducts, cables, wires, air ducts, pneumatic tubes and ducts, and similar building service equipment that pass through floors and smoke barriers shall be protected as follows:

- (1) The space between the penetrating item and the smoke barrier shall meet one of the following conditions:
 - a. It shall be filled with a material that is capable of maintaining the smoke resistance of the smoke barrier.
 - b. It shall be protected by an approved device that is designed for the specific purpose.
- (2) Where the penetrating item uses a sleeve to penetrate the smoke barrier, the sleeve shall be solidly set in the smoke barrier, and the space between the item and the sleeve shall meet one of the following conditions:

- a. It shall be filled with a material that is capable of maintaining the smoke resistance of the smoke barrier.
 - b. It shall be protected by an approved device that is designed for the specific purpose.
- (3) Where designs take transmission of vibration into consideration, any vibration isolation shall meet one of the following conditions:
- a. It shall be made on either side of the smoke barrier.
 - b. It shall be made by an approved device that is designed for the specific purpose.

8.3.6.2 Openings occurring at points where floors or smoke barriers meet the outside walls, other smoke barriers, or fire barriers of a building shall meet one of the following conditions:

- (1) It shall be filled with a material that is capable of maintaining the smoke resistance of the floor or smoke barrier.
- (2) It shall be protected by an approved device that is designed for the specific purpose.

SECTION 8.4 SPECIAL HAZARD PROTECTION

8.4.1 General.

8.4.1.1* 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) Enclose the area with a fire barrier without windows that has a 1-hour fire resistance rating in accordance with Section 8.2.
- (2) Protect the area with automatic extinguishing systems in accordance with Section 9.7.
- (3) Apply both 8.4.1.1(1) and (2) where the hazard is severe or where otherwise specified by Chapters 12 through 42.

8.4.1.2 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 8.2.4.

Exception No. 1: This requirement shall not apply to mercantile occupancy general storage areas and stockrooms protected by automatic sprinklers in accordance with Section 9.7.

Exception No. 2: This requirement shall not apply to hazardous areas in industrial occupancies protected by automatic extinguishing systems in accordance with 40.3.2.

8.4.1.3 Doors in barriers required to have a fire resistance rating shall have a $3/4$ -hour fire protection rating and shall be self-closing or automatic-closing in accordance with 7.2.1.8.

8.4.2* 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.

8.4.3 Flammable Liquids and Gases.

8.4.3.1 The storage and handling of flammable liquids or gases shall be in accordance with the following applicable standards:

- (1) NFPA 30, *Flammable and Combustible Liquids Code*
- (2) NFPA 54, *National Fuel Gas Code*
- (3) NFPA 58, *Liquefied Petroleum Gas Code*

8.4.3.2* No storage or handling of flammable liquids or gases shall be permitted in any location where such storage would jeopardize egress from the structure, unless otherwise permitted by 8.4.3.1.

8.4.4 Laboratories. Laboratories that use chemicals shall comply with NFPA 45, *Standard on Fire Protection for Laboratories Using Chemicals*, unless otherwise modified by other provisions of this Code.

Exception: Laboratories in health care occupancies and medical and dental offices shall comply with NFPA 99, Standard for Health Care Facilities.

8.4.5* Hyperbaric Facilities. All occupancies containing hyperbaric facilities shall comply with NFPA 99, *Standard for Health Care Facilities*, Chapter 19, unless otherwise modified by other provisions of this Code.

Chapter 9 BUILDING SERVICE AND FIRE PROTECTION EQUIPMENT

SECTION 9.1 UTILITIES

9.1.1 Gas. Equipment using gas and related gas piping shall be in accordance with NFPA 54, *National Fuel Gas Code*, or NFPA 58, *Liquefied Petroleum Gas Code*, unless existing installations, which shall be permitted to be continued in service, subject to approval by the authority having jurisdiction.

9.1.2 Electric. Electrical wiring and equipment shall be in accordance with NFPA 70, *National Electrical Code*, unless existing installations, which shall be permitted to be continued in service, subject to approval by the authority having jurisdiction.

9.1.3 Emergency Generators. Emergency generators, where required for compliance with this *Code*, shall be tested and maintained in accordance with NFPA 110, *Standard for Emergency and Standby Power Systems*.

9.1.4 Stored electrical energy systems shall be maintained in accordance with NFPA 111, *Standard on Stored Electrical Energy Emergency and Standby Power Systems*.

SECTION 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, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, or NFPA 90B, *Standard for the Installation of Warm Air Heating and Air-Conditioning Systems*, as applicable, unless existing installations, which shall be permitted to be continued in service, subject to approval by the authority having jurisdiction.

9.2.2 Ventilating or Heat-Producing Equipment. Ventilating or heat-producing equipment shall be in accordance with NFPA 91, *Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Noncombustible Particulate Solids*; NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances*; NFPA 31, *Standard for the Installation of Oil-Burning Equipment*; NFPA 54, *National Fuel Gas Code*; or NFPA 70, *National Electrical Code*, as applicable, unless existing installations, which shall be permitted to be continued in service, subject to approval by the authority having jurisdiction.

9.2.3 Commercial Cooking Equipment. Commercial cooking equipment shall be in accordance with NFPA 96, *Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations*, unless existing installations, which shall be permitted to be continued in service, subject to approval by the authority having jurisdiction.

9.2.4 Ventilating Systems in Laboratories Using Chemicals. Ventilating systems in laboratories using chemicals shall be in accordance with NFPA 45, *Standard on Fire Protection for Laboratories Using Chemicals*, or NFPA 99, *Standard for Health Care Facilities*, as appropriate.

SECTION 9.3 SMOKE CONTROL

9.3.1* General. Smoke control systems, where required or permitted by Chapters 11 through 42, shall have an approved maintenance and testing program to ensure operational integrity. The purpose of such smoke control systems shall be

to confine smoke to the general area of fire origin and maintain use of the means of egress system.

SECTION 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/ANSI A17.1, *Safety Code for Elevators and Escalators*.

9.4.2.2 Except as modified herein, existing elevators, escalators, dumbwaiters, and moving walks shall conform to the requirements of ASME/ANSI A17.3, *Safety Code for Existing Elevators and Escalators*.

9.4.3 Fire Fighters' Service.

9.4.3.1 All new elevators shall conform to the Fire Fighters' Service Requirements of ASME/ANSI A17.1, *Safety Code for Elevators and Escalators*.

9.4.3.2 All existing elevators having a travel distance of 25 ft (7.6 m) 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 Fire Fighters' Service Requirements of ASME/ANSI 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 8.2.5.9.

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 independent ventilation or air conditioning systems required to maintain temperature during fire fighters' service operation for elevator operation (*see 9.4.4 and 9.4.5*). The operating temperature shall be established by the elevator equipment manufacturer's specifications. When standby power is connected to the elevator, the machine room ventilation or air conditioning shall be connected to standby power.

9.4.6 Elevator Testing. Elevators shall be subject to routine and periodic inspections and tests as specified in ASME/ANSI A17.1, *Safety Code for Elevators and Escalators*. All elevators equipped with fire fighter service in accordance with 9.4.4 and 9.4.5 shall be subject to a monthly operation with a written record of the findings made and kept on the premises as required by ASME/ANSI A17.1, *Safety Code for Elevators and Escalators*.

9.4.7 Openings. Conveyors, elevators, dumbwaiters, and pneumatic conveyors serving various stories of a building shall not open to an exit.

SECTION 9.5 RUBBISH CHUTES, INCINERATORS, AND LAUNDRY CHUTES

9.5.1 Enclosure. Rubbish chutes and laundry chutes shall be separately enclosed by walls or partitions in accordance with the provisions of Section 8.2. Inlet openings serving chutes

shall be protected in accordance with Section 8.2. Doors of such chutes shall open only to a room that is designed and used exclusively for accessing the chute opening. The room shall be separated from other spaces in accordance with Section 8.4.

Exception No. 1: Existing installations having properly enclosed service chutes and properly installed and maintained service openings shall be permitted to have inlets open to a corridor or normally occupied space.

Exception No. 2: Rubbish chutes and laundry chutes shall be permitted to open into rooms not exceeding 400 ft² (37 m²) in area used for storage, provided that the room is protected by automatic sprinklers.

9.5.2 Installation and Maintenance. Rubbish chutes, laundry chutes, and incinerators shall be installed and maintained in accordance with NFPA 82, *Standard on Incinerators and Waste and Linen Handling Systems and Equipment*, unless existing installations, which shall be permitted to be continued in service, subject to approval by the authority having jurisdiction.

SECTION 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 allowed by this *Code* shall be considered required systems and shall meet the provisions of this *Code* applicable to required systems.

9.6.1.3* The provisions of Section 9.6 cover the basic functions of a complete fire alarm system, including fire detection, alarm, and communications. These systems are primarily intended to provide the indication and warning of abnormal conditions, the summoning of appropriate aid, and the control of occupancy facilities to enhance protection of life.

9.6.1.4 A fire alarm system required for life safety shall be installed, tested, and maintained in accordance with the applicable requirements of NFPA 70, *National Electrical Code*, and NFPA 72, *National Fire Alarm Code*, unless an existing installation, which shall be permitted to be continued in use, subject to the approval of the authority having jurisdiction.

9.6.1.5 All systems and components shall be approved for the purpose for which they are installed.

9.6.1.6 Fire alarm system installation wiring or other transmission paths shall be monitored for integrity in accordance with 9.6.1.4.

9.6.1.7* To ensure operational integrity, the fire alarm system shall have an approved maintenance and testing program complying with the applicable requirements of NFPA 70, *National Electrical Code*, and NFPA 72, *National Fire Alarm Code*.

9.6.1.8* Where a required fire alarm system is out of service for more than 4 hours in a 24-hour period, the authority having jurisdiction shall be notified, and the building shall be evacuated or an approved fire watch shall be provided for all parties left unprotected by the shutdown until the fire alarm system has been returned to service.

9.6.1.9 For the purposes of this *Code*, a complete fire alarm system shall be used for initiation, notification, and control and shall provide the following.

(a) *Initiation.* The initiation function provides the input signal to the system.

(b) *Notification.* The notification function is the means by which the system advises that human action is required in response to a particular condition.

(c) *Control.* The control function provides outputs to control building equipment to enhance protection of life.

9.6.2 Signal Initiation.

9.6.2.1 Where required by other sections of this *Code*, actuation of the complete 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 approved for the particular application and shall be used only for fire-protective signaling purposes. Combination fire alarm and guard's tour stations shall be acceptable.

9.6.2.3 A manual fire alarm box shall be provided in the natural exit access path near each required exit from an area, unless modified by another section of this *Code*.

9.6.2.4* Additional manual fire alarm boxes shall be located so that, from any part of the building, no horizontal distance on the same floor exceeding 200 ft (60 m) shall be traversed to reach a manual fire alarm box.

9.6.2.5 For fire alarm systems using automatic fire detection or waterflow detection devices, not less than one manual fire alarm box shall be provided to initiate a fire alarm signal. This manual fire alarm box shall be located where required by the authority having jurisdiction.

9.6.2.6* Each manual fire alarm box on a system shall be accessible, unobstructed, and visible.

9.6.2.7 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.

9.6.2.8 Where a complete smoke detection system is required by another section of this *Code*, automatic detection of smoke in accordance with NFPA 72, *National Fire Alarm Code*, shall be provided in all occupiable areas, common areas, and work spaces in those environments suitable for proper smoke detector operation.

9.6.2.9 Where a partial smoke detection system is required by another section of this *Code*, automatic detection of smoke in accordance with NFPA 72, *National Fire Alarm Code*, shall be provided in all common areas and work spaces, such as corridors, lobbies, storage rooms, equipment rooms, and other tenantless spaces in those environments suitable for proper smoke detector operation. Selective smoke detection unique to other sections of this *Code* shall be provided as required by those sections.

9.6.2.10 Smoke Alarms.

9.6.2.10.1 Where required by another section of this *Code*, single-station smoke alarms shall be in accordance with the household fire-warning equipment requirements of NFPA 72, *National Fire Alarm Code*, unless they are system smoke

detectors in accordance with NFPA 72, *National Fire Alarm Code*, and are arranged to function in the same manner.

9.6.2.10.2 Smoke alarms, other than battery-operated devices as permitted by other sections of this *Code*, or battery-operated devices complying with 9.6.1.4 and the low-power wireless system requirements of NFPA 72, *National Fire Alarm Code*, shall receive their operating power from the building electrical system.

9.6.2.10.3* In new construction, unless otherwise permitted by another section of this *Code*, where two or more smoke alarms are required within a living 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 living unit, suite of rooms, or similar area to sound.

Exception: This requirement shall not apply to configurations that provide equivalent distribution of the alarm signal.

9.6.2.10.4 The alarms shall sound only within an individual living unit, suite of rooms, or similar area and shall not actuate the building fire alarm system, unless otherwise permitted by the authority having jurisdiction. Remote annunciation shall be permitted.

9.6.2.11 Where required by Chapters 11 through 42, an automatic fire detection system shall be provided in hazardous areas for initiation of the signaling system.

9.6.3 Occupant Notification.

9.6.3.1 Occupant notification shall provide signal notification to alert occupants of fire or other emergency as required by other sections of this *Code*.

9.6.3.2 Notification shall be provided by audible and visible signals in accordance with 9.6.3.3 through 9.6.3.12.

*Exception No. 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 these detectors are monitored by the building fire alarm system, and the activation of these detectors results in an audible and visible alarm signal at a constantly attended location.

*Exception No. 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.

*Exception No. 3:** Detectors located at doors for the exclusive operation of automatic door release shall not be required to activate the building evacuation alarm.

Exception No. 4: Detectors in accordance with the exception to 22.3.4.3.1 and the exception to 23.3.4.3.1 shall not be required to activate the building evacuation alarm.

9.6.3.3 Where permitted by Chapters 11 through 42, a presignal system shall be permitted where the initial fire alarm signal is automatically transmitted without delay to a municipal fire department, a fire brigade (if provided), and an on-site staff person trained to respond to a fire emergency.

9.6.3.4 Where permitted by Chapters 11 through 42, a positive alarm sequence shall be permitted, provided that it is in accordance with NFPA 72, *National Fire Alarm Code*.

9.6.3.5* Where a standard evacuation signal is required by another section of this *Code*, the evacuation signal shall be the standard fire alarm evacuation signal described in NFPA 72, *National Fire Alarm Code*.

9.6.3.6 Notification signals for occupants to evacuate shall be by audible and visible signals in accordance with NFPA 72, *National Fire Alarm Code*, and CABO/ANSI A117.1, *American National Standard for Accessible and Usable Buildings and Facilities*, or other means of notification acceptable to the authority having jurisdiction shall be provided.

Exception No. 1: Areas not subject to occupancy by persons who are hearing impaired shall not be required to comply with the provisions for visible signals.

Exception No. 2: Visible-only signals shall be provided where specifically permitted in health care occupancies in accordance with the provisions of Chapters 18 and 19.

Exception No. 3: Existing alarm systems shall not be required to comply with the provision for visible signals.

Exception No. 4: Visible signals shall not be required in lodging or rooming houses in accordance with the provisions of Chapter 26.

9.6.3.7 The general evacuation alarm signal shall operate throughout the entire building.

*Exception No. 1:** Where total evacuation of occupants is impractical due to building configuration, only the occupants in the affected zones shall be initially notified. Provisions shall be made to selectively notify occupants in other zones to afford orderly evacuation of the entire building.

Exception No. 2: Where occupants are incapable of evacuating themselves because of age, physical or mental disabilities, or physical restraint, the private operating mode as described in NFPA 72, National Fire Alarm Code, shall be permitted to be used. Only the attendants and other personnel required to evacuate occupants from a zone, area, floor, or building shall be required to be notified. This notification shall include means to readily identify the zone, area, floor, or building in need of evacuation.

Exception No. 3: Notification within the covered mall per 36.4.4.3.3 and 37.4.4.3.3.

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 occurring 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 the same building.

9.6.3.10 Automatically transmitted or live voice evacuation or relocation instructions to occupants shall be permitted and shall be in accordance with NFPA 72, *National Fire Alarm Code*.

9.6.3.11 Audible and visible fire alarm notification appliances shall be used only for fire alarm system or other emergency purposes, unless otherwise permitted by another section of this *Code*.

Exception: Voice communication systems shall be permitted to be used for other purposes, subject to the approval of the authority having jurisdiction, if the fire alarm system takes precedence over all other signals.

9.6.3.12 Alarm notification signals shall take precedence over all other signals.

9.6.4 Emergency Forces Notification. 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.

Where fire department 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, *National Fire Alarm Code*:

- (1) Auxiliary alarm system
- (2) Central station connection
- (3) Proprietary system
- (4) Remote station connection

Exception: For existing installations where none of the means of notification specified in 9.6.4(1) through (4) is available, a plan for notification of the municipal fire department, acceptable to the authority having jurisdiction, shall be permitted.

9.6.5 Emergency Control.

9.6.5.1 A fire alarm and control system, where required by another section of this *Code*, shall be arranged to actuate automatically the control functions necessary to make the protected premises safer for building occupants.

9.6.5.2 Where required by another section of this *Code*, the following functions shall be actuated by the complete fire alarm system:

- (1) Release of hold-open devices for doors or other opening protectives
- (2) Stairwell or elevator shaft pressurization
- (3) Smoke management or smoke control systems
- (4) Emergency lighting control
- (5) Unlocking of doors

9.6.5.3 The functions specified in 9.6.5.2 shall be permitted to be actuated by any fire alarm and control system where otherwise not required by this *Code*. Additionally, such a fire alarm and control system shall be permitted to recall elevators, as required by Section 9.4, if the activation of the system for this purpose comes only from elevator lobby, hoistway, or associated machine room detectors.

9.6.5.4* Installation of emergency control devices shall be in accordance with NFPA 72, *National Fire Alarm Code*. The performance of emergency control functions shall not impair the effective response of all required alarm notification functions.

9.6.6 Location of Controls. Operator controls, alarm indicators, and manual communications capability shall be installed in a control center at a convenient location acceptable to the authority having jurisdiction.

9.6.7 Annunciation.

9.6.7.1 Where alarm annunciation is required by another section of this *Code*, it shall comply with 9.6.7.2 through 9.6.7.7.

9.6.7.2 Alarm annunciation at the control center shall be by means of audible and visible indicators.

9.6.7.3 For the purposes of alarm annunciation, each floor of the building, other than floors of existing buildings, shall be considered as not less than one zone, unless otherwise permitted by another section of this *Code*.

9.6.7.4 Unless otherwise permitted by another section of this *Code*, if a floor area exceeds 20,000 ft² (1860 m²), additional zoning shall be provided, and the length of any single zone shall not exceed 300 ft (91 m) in any direction.

Exception: Where the building is provided with automatic sprinklers throughout, installed in accordance with Section 9.7, the area of the alarm zone shall be permitted to coincide with the allowable area of the sprinkler zone.

9.6.7.5 A system trouble signal shall be annunciated at the control center by means of audible and visible indicators.

9.6.7.6 A system supervisory signal shall be annunciated at the control center by means of audible and visible indicators.

9.6.7.7 Where the system serves more than one building, each building shall be considered separately.

SECTION 9.7 AUTOMATIC SPRINKLERS AND OTHER EXTINGUISHING EQUIPMENT

9.7.1 Automatic Sprinklers.

9.7.1.1* Each automatic sprinkler system required by another section of this *Code* shall be in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*.

Exception No. 1: NFPA 13R, Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height, shall be permitted for use as specifically referenced in Chapters 24 through 33 of this Code.

Exception No. 2: NFPA 13D, Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes, shall be permitted for use as provided in Chapters 24, 26, 32, and 33 of this Code.

9.7.1.2 Sprinkler piping serving not more than six sprinklers for any isolated hazardous area shall be permitted to be connected directly to a domestic water supply system having a capacity sufficient to provide 0.15 gpm/ft² (6.1 L/min·m²) of floor area throughout the entire enclosed area. An indicating shutoff valve shall be installed in an accessible location between the sprinklers and the connection to the domestic water supply.

9.7.1.3* In areas protected by automatic sprinklers, automatic heat-detection devices required by other sections of this *Code* shall be permitted to be omitted.

9.7.1.4 Automatic sprinkler 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* that apply to required systems.

9.7.2 Supervision.

9.7.2.1* Supervisory Signals. Where supervised automatic sprinkler systems are required by another section of this *Code*, supervisory attachments shall be installed and monitored for integrity in accordance with NFPA 72, *National Fire Alarm Code*, and a distinctive supervisory signal shall be provided to indicate a condition that would impair the satisfactory operation of the sprinkler system. Monitoring shall include, but shall not be limited to, monitoring of control valves, fire pump power supplies and running conditions, water tank levels and temperatures, tank pressure, and air pressure on dry-pipe valves. Supervisory signals shall sound and shall be displayed either at a location within the protected building that is constantly attended by qualified personnel or at an approved, remotely located receiving facility.

9.7.2.2 Alarm Signal Transmission. Where supervision of automatic sprinkler systems is provided in accordance with another provision of this *Code*, waterflow alarms shall be transmitted to an approved, proprietary alarm receiving facility, a remote station, a central station, or the fire department. Such connection shall be in accordance with 9.6.1.4.

9.7.3* Other Automatic Extinguishing Equipment.

9.7.3.1 In any occupancy where the character of the potential fuel for fire is such that extinguishment or control of fire is effectively accomplished by a type of automatic extinguishing system other than an automatic sprinkler system, such as water mist, carbon dioxide, dry chemical, foam, Halon 1301, water spray, or a standard extinguishing system of another type, that system shall be permitted to be installed in lieu of an automatic sprinkler system. Such systems shall be installed, inspected, and maintained in accordance with appropriate NFPA standards.

9.7.3.2 If the extinguishing system is installed in lieu of a required, supervised automatic sprinkler system, the activation of the extinguishing system shall activate the building fire alarm system, where provided. The actuation of an extinguishing system that is not installed in lieu of a required, supervised automatic sprinkler system shall be indicated at the building fire alarm system, where provided.

9.7.4 Manual Extinguishing Equipment.

9.7.4.1* Where required by the provisions of another section of this *Code*, portable fire extinguishers shall be installed, inspected, and maintained in accordance with NFPA 10, *Standard for Portable Fire Extinguishers*.

9.7.4.2 Where required by the provisions of another section of this *Code*, standpipe and hose systems shall be provided in accordance with NFPA 14, *Standard for the Installation of Standpipe, Private Hydrants, and Hose Systems*. Where standpipe and hose systems are installed in combination with automatic sprinkler systems, installation shall be in accordance with the appropriate provisions established by NFPA 13, *Standard for the Installation of Sprinkler Systems*, and NFPA 14, *Standard for the Installation of Standpipe, Private Hydrants, and Hose Systems*.

9.7.5 Maintenance and Testing. All automatic sprinkler and standpipe systems required by this *Code* shall be inspected, tested, and maintained in accordance with NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*.

9.7.6* Sprinkler System Shutdown.

9.7.6.1 Where a required automatic sprinkler system is out of service for more than 4 hours in a 24-hour period, the authority having jurisdiction shall be notified, and the building shall be evacuated or an approved fire watch shall be provided for all parties left unprotected by the shutdown until the sprinkler system has been returned to service.

9.7.6.2 Sprinkler impairment procedures shall comply with NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*.

Chapter 10 INTERIOR FINISH, CONTENTS, AND FURNISHINGS

SECTION 10.1 GENERAL

10.1.1 Application. The interior finish, contents, and furnishings provisions set forth in this chapter shall apply to new construction and existing buildings.

10.1.2 Special Definitions.

Contents and Furnishings. See 3.3.33.

Flashover. See 3.3.79.

Interior Finish. See 3.3.112.

Interior Ceiling Finish. See 3.3.112.1.

Interior Floor Finish. See 3.3.112.2.

Interior Wall Finish. See 3.3.112.3.

SECTION 10.2* INTERIOR FINISH

10.2.1 General. Classification of interior finish materials shall be in accordance with tests made under conditions simulating actual installations, provided that the authority having jurisdiction shall be permitted to establish the classification of any material on which a rating by standard test is not available.

Exception: Materials applied, in total thickness of less than 1/28 in. (0.09 cm), directly to the surface of walls and ceilings shall be exempt from tests simulating actual installation if they meet the requirements of Class A interior wall or ceiling finish when tested in accordance with 10.2.3.1 using inorganic reinforced cement board as the substrate material.

10.2.2* Use of Interior Finishes.

10.2.2.1 Requirements for interior wall and ceiling finish shall apply as follows:

- (1) Where specified elsewhere in this Code for specific occupancies (See Chapter 7 and Chapters 11 through 42.)
- (2) As specified in 10.2.4

10.2.2.2* Requirements for interior floor finish shall apply only under either or both of the following conditions:

- (1) Where floor finish requirements are specified elsewhere in this Code for specific occupancies
- (2) Where there is a floor finish of unusual hazard

10.2.3 Interior Wall or Ceiling Finish Testing and Classification.

10.2.3.1* Interior wall or ceiling finish that is required elsewhere in this Code to be Class A, Class B, or Class C, shall be classified based on test results from NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials*.

Exception No. 1: Exposed portions of structural members complying with the requirements for Type IV(2HH) construction in accordance with NFPA 220, Standard on Types of Building Construction, shall be exempt from NFPA 255 testing and classification.

Exception No. 2: Interior wall and ceiling finish tested in accordance with NFPA 286, Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth, shall be exempt from NFPA 255 testing and classification.

10.2.3.2* Products required to be tested in accordance with NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials*, shall be grouped in the following

classes in accordance with their flame spread and smoke development.

(a) *Class A Interior Wall and Ceiling Finish.* Flame spread 0–25; smoke development 0–450. Includes any material classified at 25 or less on the flame spread test scale and 450 or less on the smoke test scale. Any element thereof, when so tested, shall not continue to propagate fire.

(b) *Class B Interior Wall and Ceiling Finish.* Flame spread 26–75; smoke development 0–450. Includes any material classified at more than 25 but not more than 75 on the flame spread test scale and 450 or less on the smoke test scale.

(c) *Class C Interior Wall and Ceiling Finish.* Flame spread 76–200; smoke development 0–450. Includes any material classified at more than 75 but not more than 200 on the flame spread test scale and 450 or less on the smoke test scale.

Exception: Existing interior finish shall be exempt from the smoke development criteria.

10.2.3.3 The classification of interior finish specified in 10.2.3.2 shall be that of the basic material used by itself or in combination with other materials.

10.2.3.4 Wherever the use of Class C interior wall and ceiling finish is required, Class A or Class B shall be permitted. Where Class B interior wall and ceiling finish is required, Class A shall be permitted.

10.2.3.5 Products tested in accordance with NFPA 265, *Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Wall Coverings*, shall comply with the criteria of 10.2.3.5.1 or 10.2.3.5.2. Products tested in accordance with NFPA 286, *Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth*, shall comply with the criteria of 10.2.3.5.3.

10.2.3.5.1* The following criteria shall be met when using method A of the NFPA 265, *Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Wall Coverings*, test protocol:

- (1) Flame shall not spread to the ceiling during the 40-kW exposure.
- (2) During the 150-kW exposure, the following criteria shall be met:
 - a. Flame shall not spread to the outer extremity of the sample on the 8 ft × 12 ft (2.4 m × 3.7 m) wall.
 - b. The specimen shall not burn to the outer extremity of the 2-ft (0.6-m) wide samples mounted vertically in the corner of the room.
 - c. Burning droplets that are judged to be capable of igniting the textile wall covering or that persist in burning for 30 seconds or more shall not be formed and dropped to the floor.
 - d. Flashover shall not occur.
 - e. The maximum instantaneous net peak rate of heat release shall not exceed 300 kW.

10.2.3.5.2* The following conditions shall be met when using method B of the NFPA 265, *Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Wall Coverings*, test protocol:

- (1) Flame shall not spread to the ceiling during the 40-kW exposure.
- (2) During the 150-kW exposure, the following criteria shall be met:

- a. Flame shall not spread to the outer extremities of the sample on the 8 ft × 12 ft (2.4 m × 3.7 m) wall.
- b. Flashover shall not occur.

10.2.3.5.3 The following conditions shall be met when using NFPA 286, *Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth*, test protocol:

- (1) Flames shall not spread to the ceiling during the 40-kW exposure.
- (2) During the 160-kW exposure, the following criteria shall be met:
 - a. Flame shall not spread to the outer extremities of the sample on the 8 ft × 12 ft (2.4 m × 3.7 m) wall.
 - b. Flashover shall not occur.
- (3) For new installations, the total smoke released throughout the test shall not exceed 1000 m².

10.2.4 Specific Materials.

10.2.4.1 Textile Wall and Textile Ceiling Materials. The use of textile materials on walls or ceilings shall be limited as specified in 10.2.4.1.1 through 10.2.4.1.5.

10.2.4.1.1 Textile materials having a Class A rating (*see 10.2.3.2*) shall be permitted on the walls or ceilings of rooms or areas protected by an approved automatic sprinkler system.

10.2.4.1.2 Textile materials having a Class A rating (*see 10.2.3.2*) shall be permitted on partitions that do not exceed ³/₄ of the floor-to-ceiling height or do not exceed 8 ft (2.4 m) in height, whichever is less.

10.2.4.1.3 Textile materials having a Class A rating (*see 10.2.3.2*) shall be permitted to extend not more than 4 ft (1.2 m) above the finished floor on ceiling-height walls and ceiling-height partitions.

10.2.4.1.4 Previously approved, existing installations of textile material having a Class A rating (*see 10.2.3.2*) shall be permitted to be continued to be used.

10.2.4.1.5* Textile materials shall be permitted on walls and partitions where tested in accordance with NFPA 265, *Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Wall Coverings*. (*See 10.2.3.5.*)

10.2.4.2* Expanded Vinyl Wall or Ceiling Coverings. Expanded vinyl wall or ceiling coverings shall comply with one of the following conditions:

- (1) Materials having a Class A rating (*see 10.2.3.2*) shall be permitted on the walls or ceilings of rooms or areas protected by an approved automatic sprinkler system.
- (2) Materials having a Class A rating (*see 10.2.3.2*) shall be permitted on partitions that do not exceed ³/₄ of the floor-to-ceiling height or do not exceed 8 ft (2.4 m) in height, whichever is less.
- (3) Materials having a Class A rating (*see 10.2.3.2*) shall be permitted up to 4 ft (1.2 m) above the finished floor on ceiling-height walls and ceiling-height partitions.
- (4) Existing installations of materials with the appropriate wall finish classification for the occupancy involved, and with classification in accordance with the provisions in 10.2.3.2, shall be permitted to be continued to be used.
- (5) Materials shall be permitted on walls and partitions where tested in accordance with NFPA 265, *Standard*

Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Wall Coverings. (*See 10.2.3.5.*)

- (6) Materials shall be permitted on walls, partitions, and ceilings where tested in accordance with NFPA 286, *Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth*. (*See 10.2.3.5.*)

10.2.4.3 Cellular or Foamed Plastic. Cellular or foamed plastic materials shall not be used as interior wall and ceiling finish.

Exception No. 1: Cellular or foamed plastic material shall be permitted on the basis of fire tests that substantiate their combustibility characteristics for the use intended under actual fire conditions.

Exception No. 2: Cellular or foamed plastic shall be permitted for trim not in excess of 10 percent of the wall or ceiling area, provided that it is not less than 20 lb/ft³ (320 kg/m³) in density, is limited to ¹/₂ in. (1.3 cm) in thickness and 4 in. (10.2 cm) in width, and complies with the requirements for Class A or Class B interior wall and ceiling finish as described in 10.2.3.2; however, the smoke rating shall not be limited.

10.2.4.4* Light-Transmitting Plastics. Light-transmitting plastics shall be permitted to be used as interior wall and ceiling finish if approved by the authority having jurisdiction.

10.2.4.5 Surface Nonmetallic Raceways. Where surface non-metallic raceway products, as permitted by NFPA 70, *National Electrical Code*, are regulated as interior finish, they shall comply with the requirements for Class A interior wall and ceiling finish as described in 10.2.3.2 and tested in the form in which they are used. The smoke rating shall not be limited when the raceway is less than 10 percent of the wall or ceiling area.

10.2.4.6 Decorations and Furnishings. Decorations and furnishings that do not meet the definition of *interior finish* shall be regulated by the provisions of Section 10.3.

10.2.5 Trim and Incidental Finish. Interior wall and ceiling finish not in excess of 10 percent of the aggregate wall and ceiling areas of any room or space shall be permitted to be Class C materials in occupancies where interior wall and ceiling finish of Class A or Class B is required.

10.2.6* Fire-Retardant Coatings.

10.2.6.1 The required flame spread or smoke development classification of existing surfaces of walls, partitions, columns, and ceilings shall be permitted to be secured by applying approved fire-retardant coatings to surfaces having higher flame spread ratings than permitted. Such treatments shall comply with the requirements of NFPA 703, *Standard for Fire Retardant Impregnated Wood and Fire Retardant Coatings for Building Materials*.

10.2.6.2 Fire-retardant coatings shall possess the desired degree of permanency and shall be maintained so as to retain the effectiveness of the treatment under the service conditions encountered in actual use.

10.2.7 Interior Floor Finish Testing and Classification.

10.2.7.1* Interior floor finishes shall be classified in accordance with 10.2.7.2 based on test results from NFPA 253, *Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source*.

10.2.7.2 Interior floor finishes shall be grouped in the following classes in accordance with the critical radiant flux ratings.

- (a) *Class I Interior Floor Finish.* Critical radiant flux not less than 0.45 W/cm² as determined by the test described in 10.2.7.1.

(b) *Class II Interior Floor Finish.* Critical radiant flux not less than 0.22 W/cm² but less than 0.45 W/cm² as determined by the test described in 10.2.7.1.

10.2.7.3 Wherever the use of Class II interior floor finish is required, Class I interior floor finish shall be permitted.

10.2.8 Automatic Sprinklers.

10.2.8.1 Unless specifically prohibited elsewhere in this *Code*, where an approved automatic sprinkler system is in accordance with Section 9.7, Class C interior wall and ceiling finish materials shall be permitted in any location where Class B is required, and Class B interior wall and ceiling finish materials shall be permitted in any location where Class A is required.

10.2.8.2 Unless specifically prohibited elsewhere in this *Code*, where an approved automatic sprinkler system is in accordance with Section 9.7, Class II interior floor finish shall be permitted in any location where Class I interior floor finish is required, and where Class II is required, no critical radiant flux rating shall be required.

SECTION 10.3 CONTENTS AND FURNISHINGS

10.3.1* Where required by the applicable provisions of this *Code*, draperies, curtains, and other similar loosely hanging furnishings and decorations shall be flame resistant as demonstrated by testing in accordance with NFPA 701, *Standard Methods of Fire Tests for Flame Propagation of Textiles and Films*.

10.3.2* Where required by the applicable provisions of this *Code*, upholstered furniture and mattresses shall be resistant to a cigarette ignition (that is, smoldering) in accordance with the following:

- (1) Where required by the applicable provisions of this *Code*, the components of the upholstered furniture, unless located in rooms or spaces protected by an approved automatic sprinkler system, shall meet the requirements for Class I when tested in accordance with NFPA 260, *Standard Methods of Tests and Classification System for Cigarette Ignition Resistance of Components of Upholstered Furniture*.
- (2) Where required by the applicable provisions of this *Code*, mocked-up composites of the upholstered furniture, unless located in rooms or spaces protected by an approved automatic sprinkler system, shall have a char length not exceeding 1.5 in. (3.8 cm) when tested in accordance with NFPA 261, *Standard Method of Test for Determining Resistance of Mock-Up Upholstered Furniture Material Assemblies to Ignition by Smoldering Cigarettes*.

- (3) *Where required by the applicable provisions of this *Code*, mattresses, unless located in rooms or spaces protected by an approved automatic sprinkler system, shall have a char length not exceeding 2 in. (5.1 cm) when tested in accordance with Part 1632 of the *Code of Federal Regulations* 16.

10.3.3* Where required by the applicable provisions of this *Code*, upholstered furniture, unless the furniture is located in a room or space protected by an approved automatic sprinkler system, shall have limited rates of heat release when tested in accordance with NFPA 266, *Standard Method of Test for Fire Characteristics of Upholstered Furniture Exposed to Flaming Ignition Source*, or with ASTM E 1537, *Standard Method for Fire Testing of Real Scale Upholstered Furniture Items*, as follows:

- (1) The peak rate of heat release for the single upholstered furniture item shall not exceed 250 kW.
- (2) The total energy released by the single upholstered furniture item during the first 5 minutes of the test shall not exceed 40 MJ.

10.3.4* Where required by the applicable provisions of this *Code*, mattresses, unless the mattress is located in a room or space protected by an approved automatic sprinkler system, shall have limited rates of heat release when tested in accordance with NFPA 267, *Standard Method of Test for Fire Characteristics of Mattresses and Bedding Assemblies Exposed to Flaming Ignition Source*, or ASTM E 1590, *Standard Method for Fire Testing of Real Scale Mattresses*, as follows:

- (1) The peak rate of heat release for the mattress shall not exceed 250 kW.
- (2) The total energy released by the mattress during the first 5 minutes of the test shall not exceed 40 MJ.

10.3.5* Furnishings or decorations of an explosive or highly flammable character shall not be used.

10.3.6 Fire-retardant coatings shall be maintained to retain the effectiveness of the treatment under service conditions encountered in actual use.

10.3.7* Where required by the applicable provisions of this *Code*, furnishings and contents made with foamed plastic materials that are unprotected from ignition shall have a heat release rate not exceeding 100 kW when tested in accordance with UL 1975, *Standard for Fire Tests for Foamed Plastics Used for Decorative Purposes*.

Chapter 11 SPECIAL STRUCTURES AND HIGH-RISE BUILDINGS

SECTION 11.1 GENERAL REQUIREMENTS

11.1.1 Application. The requirements of Sections 11.1 through 11.11 apply to occupancies regulated by Chapters 12 through 42 that are in a special structure. The provisions of the applicable chapter (that is, 12 through 42) shall apply, except as modified by this chapter. Section 11.8 applies to high-rise buildings only where specifically required by Chapters 12 through 42.

11.1.2 Mixed Occupancies. (See 6.1.14.)

11.1.3 Special Definitions. (See the defined terms within each special structure section.)

11.1.4 Classification of Occupancy. Occupancies regulated by Chapters 12 through 42 that are in special structures shall meet the requirements of those chapters, except as modified by this chapter.

11.1.5 Classification of Hazard of Contents. Classification of hazard of contents shall be in accordance with Section 6.2.

11.1.6 Minimum Construction Requirements. Minimum construction requirements shall be in accordance with the applicable occupancy chapter.

11.1.7 Occupant Load. The occupant load of special structures shall be based on the use of the structure as regulated by Chapters 12 through 42.

SECTION 11.2 OPEN STRUCTURES

11.2.1 Application.

11.2.1.1 The provisions of Section 11.1 shall apply.

11.2.1.2 Definition — Open Structure. See 3.3.140.

11.2.2* Means of Egress.

11.2.2.1 General. The means of egress provisions of the applicable occupancy chapter (Chapters 12 through 42) shall apply, except as modified by 11.2.2.2 through 11.2.2.10.

11.2.2.2 Means of Egress Components.

11.2.2.2.1 Fire Escape Ladders. Open structures that are designed for occupancy by not more than three persons shall be permitted to be served by fire escape ladders complying with 7.2.9.

11.2.2.3 Capacity of Means of Egress. Open structures shall be exempt from the requirements for capacity of means of egress.

11.2.2.4 Number of Means of Egress.

11.2.2.4.1 The grade level of open structures, which by their very nature contain an infinite number of means of egress, shall be exempt from the requirements for number of means of egress.

11.2.2.4.2 Open structures occupied by not more than three persons, with travel distance not more than 200 ft (60 m), shall be permitted to have a single exit.

11.2.2.5 Arrangement of Means of Egress. (No modifications.)

11.2.2.6 Travel Distance to Exits. Open structures shall be exempt from travel distance limitations.

11.2.2.7 Discharge from Exits. Open structures permitted to have a single exit per 11.2.2.4 shall be permitted to have 100 percent of the exit discharge through areas on the level of exit discharge.

11.2.2.8 Illumination of Means of Egress. Open structures shall be exempt from illumination of means of egress requirements.

11.2.2.9 Emergency Lighting. Open structures shall be exempt from emergency lighting requirements.

11.2.2.10 Marking of Means of Egress. Open structures shall be exempt from marking of means of egress requirements.

11.2.3 Protection.

11.2.3.1 Protection of Vertical Openings. Open structures shall be exempt from protection of vertical opening requirements.

11.2.3.2 Protection from Hazards. Every open structure, other than those structures with only occasional occupancy, shall have automatic, manual, or other protection that is appropriate to the particular hazard and that is designed to minimize danger to occupants in case of fire or other emergency before they have time to use the means of egress.

11.2.3.3 Interior Finish. (No modifications.)

11.2.3.4 Detection, Alarm, and Communications Systems. Open structures shall be exempt from requirements for detection, alarm, and communications systems.

11.2.3.5 Extinguishing Requirements. (No modifications.)

SECTION 11.3 TOWERS

11.3.1 Application.

11.3.1.1 The provisions of Section 11.1 shall apply.

11.3.1.2 Definition — Tower. See 3.3.203.

11.3.2 Means of Egress.

11.3.2.1 General. The means of egress provisions of the applicable occupancy chapter (Chapters 12 through 42) shall apply, except as modified by 11.3.2.2 through 11.3.2.10.

11.3.2.2 Means of Egress Components.

11.3.2.2.1 Fire Escape Ladders. Towers, such as forest fire observation or railroad signal towers, that are designed for occupancy by not more than three persons shall be permitted to be served by fire escape ladders complying with 7.2.9.

11.3.2.2.2 Elevators. Towers subject to occupancy by not more than 90 persons shall be permitted to use elevators in the means of egress in accordance with 7.2.13.

11.3.2.3 Capacity of Means of Egress.

11.3.2.3.1 Means of egress for towers shall be provided for the number of persons expected to occupy the space.

11.3.2.3.2 Spaces not subject to human occupancy because of machinery or equipment shall be excluded from consideration.

11.3.2.4* Number of Means of Egress.

11.3.2.4.1 Towers shall be permitted to have a single exit if the following conditions are met:

- (1) The tower is subject to occupancy by fewer than 25 persons.
- (2) The tower is not used for living or sleeping purposes.
- (3) The tower is of Type I, Type II, or Type IV construction. (See 8.2.1.)

- (4) The tower interior wall and ceiling finish is Class A or Class B.
- (5) The tower has no combustible materials in the structure, under the structure, or in the immediate vicinity of the structure, except necessary furniture.
- (6) There are no high hazard occupancies in the tower or in its immediate vicinity.
- (7) Where the tower is located above a building, the single exit from the tower shall be provided by one of the following:
 - a. An exit enclosure separated from the building with no door openings to or from the building
 - b. An exit enclosure leading directly to an exit enclosure serving the building, with walls and door separating these exit enclosures from each other, and another door allowing access to the top floor of the building that provides access to a second exit serving that floor

11.3.2.4.2 Towers with 360-degree line-of-sight requirements shall be permitted to have a single means of egress for a distance of travel not exceeding 75 ft (23 m), or 100 ft (30 m) if the tower is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

11.3.2.5 Arrangement of Means of Egress. (No modifications.)

11.3.2.6 Travel Distance to Exits. Towers where ladders are permitted by 11.3.2.2.1 shall be exempt from travel distance limitations.

11.3.2.7 Discharge from Exits. Towers permitted to have a single exit per 11.3.2.4 shall be permitted to have 100 percent of the exit discharge through areas on the level of exit discharge.

11.3.2.8 Illumination of Means of Egress. Towers where ladders are permitted by 11.3.2.2.1 shall be exempt from illumination of means of egress requirements.

11.3.2.9 Emergency Lighting.

11.3.2.9.1 Towers where ladders are permitted by 11.3.2.2.1 shall be exempt from emergency lighting requirements.

11.3.2.9.2 Locations not routinely inhabited by humans shall be exempt from emergency lighting requirements.

11.3.2.9.3 Structures occupied only during daylight hours, with windows arranged to provide the required level of illumination of all portions of the means of egress during these hours, shall be exempt from emergency lighting requirements where approved by the authority having jurisdiction.

11.3.2.10 Marking of Means of Egress.

11.3.2.10.1 Towers where ladders are permitted by 11.3.2.2.1 shall be exempt from marking of means of egress requirements.

11.3.2.10.2 Locations not routinely inhabited by humans shall be exempt from marking of means of egress requirements.

11.3.3 Protection.

11.3.3.1 Protection of Vertical Openings.

11.3.3.1.1 Towers where ladders are permitted by 11.3.2.2.1 shall be exempt from protection of vertical opening requirements.

11.3.3.1.2 In towers where the support structure is open and there is no occupancy below the top floor level, stairs shall be

permitted to be open with no enclosure required, or fire escape stairs shall be permitted.

11.3.3.2 Protection from Hazards. Every tower, other than structures with only occasional occupancy, shall have automatic, manual, or other protection that is appropriate to the particular hazard and that is designed to minimize danger to occupants in case of fire or other emergency before they have time to use the means of egress.

11.3.3.3 Interior Finish. (No modifications.)

11.3.3.4 Detection, Alarm, and Communications Systems. Towers designed for occupancy by not more than three persons shall be exempt from requirements for detection, alarm, and communications systems.

11.3.3.5 Extinguishing Requirements. (No modifications.)

11.3.3.6 Corridors. (No modifications.)

SECTION 11.4 WATER-SURROUNDED STRUCTURES

11.4.1 Application.

11.4.1.1 The provisions of Section 11.1 shall apply.

Exception: Any structure surrounded by water and under the jurisdiction of the U.S. Coast Guard and designed and arranged in accordance with Coast Guard regulations shall be exempt from the requirements of this Code.

11.4.1.2 Definition — Water-Surrounded Structure. See 3.3.210.

11.4.2 Means of Egress.

11.4.2.1 General. The means of egress provisions of the applicable occupancy chapter (Chapters 12 through 42) shall apply, except as modified by 11.4.2.2 through 11.4.2.10.

11.4.2.2 Means of Egress Components. (No modifications.)

11.4.2.3 Capacity of Means of Egress. Spaces in water-surrounded structures that are not subject to human occupancy because of machinery or equipment shall be exempt from the requirements for capacity of means of egress.

11.4.2.4 Number of Means of Egress. (No modifications.)

11.4.2.5 Arrangement of Means of Egress. (No modifications.)

11.4.2.6 Travel Distance to Exits. (No modifications.)

11.4.2.7 Discharge from Exits. Structures permitted to have a single exit per the applicable occupancy chapter shall be permitted to have 100 percent of the exit discharge through areas on the level of exit discharge.

11.4.2.8 Illumination of Means of Egress. (No modifications.)

11.4.2.9 Emergency Lighting.

11.4.2.9.1 Locations not routinely inhabited by humans are exempt from emergency lighting requirements.

11.4.2.9.2 Structures occupied only during daylight hours, with windows arranged to provide the required level of illumination of all portions of the means of egress during these hours, shall be exempt from emergency lighting requirements, where approved by the authority having jurisdiction.

11.4.2.10 Marking of Means of Egress. Locations not routinely inhabited by humans shall be exempt from marking of means of egress requirements.

11.4.3 Protection.**11.4.3.1 Protection of Vertical Openings.** (No modifications.)

11.4.3.2 Protection from Hazards. Every water-surrounded structure, other than structures with only occasional occupancy, shall have automatic, manual, or other protection that is appropriate to the particular hazard and that is designed to minimize danger to occupants in case of fire or other emergency before they have time to use the means of egress.

11.4.3.3 Interior Finish. (No modifications.)**11.4.3.4 Detection, Alarm, and Communications Systems.** (No modifications.)**11.4.3.5 Extinguishing Requirements.** (No modifications.)**11.4.3.6 Corridors.** (No modifications.)**SECTION 11.5* PIERS**

11.5.1 Application. The provisions of Section 11.1 shall apply.

11.5.2 Number of Means of Egress. Piers used exclusively to moor cargo vessels and to store material shall be exempt from number of means of egress requirements where provided with proper means of egress from structures thereon to the pier and a single means of access to the mainland, as appropriate with the pier's arrangement.

11.5.3 Arrangement of Means of Egress. Piers not meeting the requirements of 11.5.2 and occupied for other than cargo handling and storage shall have means of egress arranged in accordance with Chapters 12 through 42. In addition, one of the following measures shall be provided on piers extending over 150 ft (45 m) from shore to minimize the possibility that fire under or on the pier might block the escape of occupants to shore:

- (1) The pier shall be arranged to provide two separate ways to travel to shore, such as by two well-separated walkways or independent structures.
- (2) The pier deck shall be open, fire resistive, and set on non-combustible supports.
- (3) The pier shall be open, unobstructed, and not less than 50 ft (15 m) in width if less than 500 ft (150 m) long, or its width shall be not less than 10 percent of its length if more than 500 ft (150 m) long.
- (4) The pier deck shall be provided with an approved automatic sprinkler system in accordance with Section 9.7 for combustible substructure and all superstructures; and, the sprinkler system shall be supervised if the applicable occupancy chapter requires supervision of sprinkler systems.

SECTION 11.6* VEHICLES AND VESSELS

11.6.1 Vehicles. Where immobile, attached to a building, or permanently fixed to a foundation, and where subject to human occupancy, the following vehicles shall comply with the requirements of this *Code* that are appropriate to buildings of similar occupancy:

- (1) Trailers
- (2) Railroad cars
- (3) Streetcars
- (4) Buses
- (5) Conveyances similar to those in 11.6.1(1) through (4)

11.6.2 Vessels. Any ship, barge, or other vessel permanently fixed to a foundation or mooring, or unable to get underway by means of its own power, and occupied for purposes other

than navigation shall be subject to the requirements of this *Code* that apply to buildings of similar occupancy.

SECTION 11.7 UNDERGROUND AND WINDOWLESS STRUCTURES

11.7.1 Application. The provisions of Section 11.1 shall apply.

11.7.2* Special Definitions.

Emergency Access Opening. See 3.3.54.

Underground Structure. See 3.3.205.

Windowless Structure. See 3.3.212.

11.7.3 Special Provisions for Structures That Are Windowless or Underground.

11.7.3.1 A structure or portion of a structure shall not be considered windowless under the following conditions:

- (1) The structure is a one-story structure or portion thereof where the story is provided with grade level doors or emergency access openings on two sides of the building, spaced not more than 125 ft (38 m) apart in the exterior walls.
- (2) The structure is a structure or portion thereof more than one story in height where the following criteria are met:
 - a. Emergency access openings are provided on the first story as required by 11.7.3.1(1).
 - b. Every story above the first floor is provided with emergency access openings on two sides of the building, spaced not more than 30 ft (9.1 m) apart.

11.7.3.2 A structure or portion of a structure shall not be considered an underground structure if the story is provided on not less than two sides with not less than 20 ft² (1.9 m²) of emergency access opening entirely above the adjoining grade level in each 50 lineal ft (15 lineal m) of exterior enclosing wall area.

11.7.3.3 Where windowless or underground structures have an occupant load of more than 50 persons in the windowless or underground portions of the structure, the windowless or underground portions and all areas and floor levels traversed in traveling to the exit discharge shall be protected by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

Exception No. 1: This requirement shall not apply to existing windowless or underground structures with an occupant load of 100 or fewer persons in the windowless or underground portions of the structure.

Exception No. 2: This requirement shall not apply to single-story windowless structures that are permitted to have a single exit per Chapters 12 through 42 and with a common path of travel not to exceed 50 ft (15 m).

11.7.3.4 Windowless or underground portions of structures and all areas traversed in traveling to the exit discharge, other than in one- and two-family dwellings, shall be provided with emergency lighting in accordance with Section 7.9.

11.7.4 Additional Provisions for Structures That Are Underground.

11.7.4.1 A structure or portion of a structure shall not be considered an underground structure if the story is provided on not less than two sides with not less than 20 ft² (1.9 m²) of emergency access opening entirely above the adjoining grade

level in each 50 lineal ft (15 lineal m) of exterior enclosing wall area.

11.7.4.2 The requirements of 11.7.3 shall apply.

11.7.4.3 Exits from underground structures having an occupant load of more than 100 persons in the underground portions of the structure and having a floor used for human occupancy more than 30 ft (9.1 m) or more than one level below the lowest level of exit discharge shall be as follows:

- (1) Exits shall be cut off from the level of exit discharge per 7.1.3.2.
- (2) Exits shall be provided with outside smoke-venting facilities or other means to prevent the exits from becoming charged with smoke from any fire in the areas served by the exits.

11.7.4.4 The underground portions of an underground structure, other than an existing underground structure, shall be provided with approved automatic smoke venting in accordance with Section 9.3 where the underground structure has the following:

- (1) An occupant load of more than 100 persons in the underground portions of the structure
- (2) A floor level used for human occupancy more than 30 ft (9.1 m) or more than one level below the lowest level of exit discharge
- (3) Combustible contents, combustibles interior finish, or combustibles construction

11.7.4.5 Exit stair enclosures in underground structures having a floor level used for human occupancy more than 30 ft (9.1 m) or more than one level below the lowest level of exit discharge shall be provided with signage in accordance with 7.2.2.5.4 at each floor level landing traversed in traveling to the exit discharge. The signs shall include a chevron-shaped indicator to show direction to the exit discharge.

SECTION 11.8 HIGH-RISE BUILDINGS

11.8.1 General.

11.8.1.1 Where required by Chapters 12 through 42, the provisions of Section 11.8 shall apply to high-rise buildings as defined in 3.3.101.

11.8.1.2 In addition to the requirements of Section 11.8, compliance with all other applicable provisions of this *Code* shall be required.

11.8.2 Extinguishing Requirements.

11.8.2.1* High-rise buildings shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7. A sprinkler control valve and a waterflow device shall be provided for each floor.

11.8.2.2 High-rise buildings shall be protected throughout by a Class I standpipe system in accordance with Section 9.7.

11.8.3 Detection, Alarm, and Communications Systems.

11.8.3.1* A fire alarm system using an approved, emergency voice/alarm communication system shall be installed in accordance with Section 9.6.

11.8.3.2 Two-way telephone communication service shall be provided for fire department use. This system shall be in accordance with NFPA 72, *National Fire Alarm Code*. The communications system shall operate between the central control

station and every elevator car, every elevator lobby, and each floor level of exit stairs.

Exception: This requirement shall not apply where the fire department radio system is approved as an equivalent system.

11.8.4 Emergency Lighting and Standby Power.

11.8.4.1 Emergency lighting in accordance with Section 7.9 shall be provided.

11.8.4.2* Class 1, Type 60, standby power in accordance with NFPA 70, *National Electrical Code*, and NFPA 110, *Standard for Emergency and Standby Power Systems*, shall be provided. The standby power system shall have a capacity and rating sufficient to supply all required equipment. Selective load pickup and load shedding shall be permitted in accordance with NFPA 70, *National Electrical Code*. The standby power system shall be connected to the following:

- (1) Emergency lighting system
- (2) Fire alarm system
- (3) Electric fire pump
- (4) Central control station equipment and lighting
- (5) Not less than one elevator serving all floors, with standby power transferable to any elevator
- (6) Mechanical equipment for smokeproof enclosures
- (7) Mechanical equipment required to conform with the requirements of Section 9.3

11.8.5* Central Control Station. A central control station shall be provided in a location approved by the fire department. The control station shall contain the following:

- (1) Voice fire alarm system panels and controls
- (2) Fire department two-way telephone communication service panels and controls where required by another section of this *Code*
- (3) Fire detection and fire alarm system annunciation panels
- (4) Elevator floor location and operation annunciators
- (5) Sprinkler valve and waterflow annunciators
- (6) Emergency generator status indicators
- (7) Controls for any automatic stairway door unlocking system
- (8) Fire pump status indicators
- (9) A telephone for fire department use with controlled access to the public telephone system

SECTION 11.9 PERMANENT MEMBRANE STRUCTURES

11.9.1 General.

11.9.1.1 The provisions of Section 11.1 shall apply.

11.9.1.2 Membrane materials shall not be used where fire resistance ratings are required for walls or roofs.

Exception No. 1: Where every part of the roof, including the roof membrane, is not less than 20 ft (6.1 m) above any floor, balcony, or gallery, a noncombustible or limited-combustible membrane shall be permitted to be used as the roof in any type of construction.

Exception No. 2: With approval of the authority having jurisdiction, membrane materials shall be permitted to be used where every part of the roof membrane is sufficiently above every significant fire potential that the imposed temperature cannot exceed the capability of the membrane, including seams, to maintain its structural integrity.

11.9.1.3 Testing of membrane materials for compliance with Section 11.9 use of the categories of noncombustible and limited-combustible materials shall be performed on weathered-membrane material as defined in 3.3.211.

11.9.1.4 Flame spread of all membrane materials exposed within the structure shall be Class A in accordance with Section 10.2.

11.9.1.5 Roof membranes shall have a roof covering classification, as required by the applicable building codes, when tested in accordance with NFPA 256, *Standard Methods of Fire Tests of Roof Coverings*.

11.9.1.6 Flame Resistance.

11.9.1.6.1 All membrane structure fabric shall be flame resistant in accordance with 10.3.1.

11.9.1.6.2 One of the following shall serve as evidence that the fabric materials have the required flame resistance:

- (1) The authority having jurisdiction shall require a certificate or other evidence of acceptance by an organization acceptable to the authority having jurisdiction.
- (2) The authority having jurisdiction shall require a report of tests made by other inspection authorities or organizations acceptable to the authority having jurisdiction.

11.9.1.6.3 Where required by the authority having jurisdiction, confirmatory field tests shall be conducted using test specimens from the original material, which shall have been affixed at the time of manufacture to the exterior of the structure.

11.9.2 Tensioned-Membrane Structures.

11.9.2.1 The design, materials, and construction of the building shall be based on plans and specifications prepared by a licensed architect or engineer knowledgeable in tensioned-membrane construction.

11.9.2.2 Material loads and strength shall be based on physical properties of the materials verified and certified by an approved testing laboratory.

11.9.2.3 The membrane roof for structures in climates subject to freezing temperatures and ice buildup shall be composed of two layers with an air space between them through which heated air can be moved to guard against ice accumulation. As an alternative to the two layers, other approved methods that protect against ice accumulation shall be permitted.

11.9.2.4 Roof drains shall be equipped with electrical elements to protect against ice buildup that can prevent the drains from functioning. Such heating elements shall be served by on-site standby electrical power in addition to the normal public service. As an alternative to such electrical elements, other approved methods that protect against ice accumulation shall be permitted.

11.9.3 Air-Supported, Air-Inflated Structures.

11.9.3.1 General. In addition to the general provisions of 11.9.1, the requirements of 11.9.3 shall apply to air-supported structures.

11.9.3.2 Pressurization (Inflation) System. The pressurization system shall consist of one or more operating blower units. The system shall include automatic control of auxiliary blower units to maintain the required operating pressure. This equipment shall meet the following requirements:

- (1) Blowers shall be powered by continuous-rated motors at the maximum power required.
- (2) Blowers shall have personnel protection, such as inlet screens and belt guards.

- (3) Blower systems shall be weather protected.
- (4) Blower systems shall be equipped with back-draft check dampers.
- (5) There shall be not less than two blower units, each of which has capacity to maintain full inflation pressure with normal leakage.
- (6) The blowers shall be designed to be incapable of over-pressurization.
- (7) The auxiliary blower unit(s) shall operate automatically if there is any loss of internal pressure or if an operating blower unit becomes inoperative.
- (8) The design inflation pressure and the capacity of each blower system shall be certified by a professional engineer.

11.9.3.3 Standby Power System.

11.9.3.3.1 A fully automatic standby power system shall be provided. The system shall be either an auxiliary engine generator set capable of running the blower system or a supplementary blower unit that is sized for 1 times the normal operating capacity and is powered by an internal combustion engine.

11.9.3.3.2 The standby power system shall be fully automatic to ensure continuous inflation in the event of any failure of the primary power. This system shall be capable of operating continuously for a minimum of 4 hours.

11.9.3.3.3 The sizing and capacity of the standby power system shall be certified by a professional engineer.

11.9.4 Maintenance and Operation.

11.9.4.1 Instructions in both operation and maintenance shall be transmitted to the owner by the manufacturer of the tensioned-membrane, air-supported, or air-inflated structure.

11.9.4.2 An annual inspection and required maintenance of each structure shall be performed to ensure safety conditions. At least biennially, the inspection shall be performed by a professional engineer, registered architect, or individual certified by the manufacturer.

11.9.5 Services.

11.9.5.1 Fired Heaters.

11.9.5.1.1 Only labeled heating devices shall be used.

11.9.5.1.2 Fuel-fired heaters and their installation shall be approved by the authority having jurisdiction.

11.9.5.1.3 Containers for liquefied petroleum gases shall be installed not less than 5 ft (1.5 m) from any temporary membrane structure and shall be in accordance with the provisions of NFPA 58, *Liquefied Petroleum Gas Code*.

11.9.5.1.4 Tanks shall be secured in the upright position and protected from vehicular traffic.

11.9.5.2 Electric Heaters.

11.9.5.2.1 Only labeled heaters shall be permitted.

11.9.5.2.2 Heaters shall be connected to electricity by electric cable that is suitable for outside use and is of sufficient size to handle the electrical load.

SECTION 11.10 TEMPORARY MEMBRANE STRUCTURES

11.10.1 General.

11.10.1.1 The provisions of Section 11.1 shall apply.

11.10.1.2 Membrane structures designed to meet all the requirements of Section 11.10 shall be permitted to be used as temporary buildings subject to the approval of the authority having jurisdiction.

11.10.1.3 Temporary tensioned-membrane structures shall be permitted to comply with Section 11.11 instead of Section 11.10.

11.10.1.4 Roof membranes shall have a roof covering classification, as required by the applicable building codes, when tested in accordance with NFPA 256, *Standard Methods of Fire Tests of Roof Coverings*.

11.10.1.5 Flame Resistance.

11.10.1.5.1 All membrane structure fabric shall be flame resistant in accordance with 10.3.1.

11.10.1.5.2 One of the following shall serve as evidence that the fabric materials have the required flame resistance:

- (1) The authority having jurisdiction shall require a certificate or other evidence of acceptance by an organization acceptable to the authority having jurisdiction.
- (2) The authority having jurisdiction shall require a report of tests made by other inspection authorities or organizations acceptable to the authority having jurisdiction.

11.10.1.5.3 Where required by the authority having jurisdiction, confirmatory field tests shall be conducted using test specimens from the original material, which shall have been affixed at the time of manufacture to the exterior of the structure.

11.10.2 Fire Hazards.

11.10.2.1 The ground enclosed by any temporary membrane structure, and the ground for a reasonable distance but for not less than 10 ft (3 m) outside of such a structure(s), shall be cleared of all flammable or combustible material or vegetation. This work shall be accomplished to the satisfaction of the authority having jurisdiction prior to the erection of such a structure(s). The premises shall be kept free from such flammable or combustible materials during the period for which the premises are used by the public.

Exception: Removal of flammable or combustible material shall not apply to areas used for necessary support equipment.

11.10.2.2 Where prohibited by the authority having jurisdiction, smoking shall not be permitted in any temporary membrane structure.

11.10.3 Fire-Extinguishing Equipment. Portable fire-extinguishing equipment of approved types shall be furnished and maintained in temporary membrane structures in such quantity and in such locations as directed by the authority having jurisdiction.

11.10.4 Tensioned-Membrane Structures.

11.10.4.1 The design, materials, and construction of the building shall be based on plans and specifications prepared by a licensed architect or engineer knowledgeable in tension-membrane construction.

11.10.4.2 Material loads and strength shall be based on physical properties of the materials verified and certified by an approved testing laboratory.

11.10.4.3 The membrane roof for structures in climates subject to freezing temperatures and ice buildup shall be composed of two layers with an air space between them through

which heated air can be moved to guard against ice accumulation. As an alternative to the two layers, other approved methods that protect against ice accumulation shall be permitted.

11.10.4.4 Roof drains shall be equipped with electrical elements to protect against ice buildup that can prevent the drains from functioning. Such heating elements shall be served by on-site standby electrical power in addition to the normal public service. As an alternative to such electrical elements, other approved methods that protect against ice accumulation shall be permitted.

11.10.5 Air-Supported, Air-Inflated Structures.

11.10.5.1 General. In addition to the general provisions of 11.10.1, the requirements of 11.10.5 shall apply to air-supported structures.

11.10.5.2 Pressurization (Inflation) System. The pressurization system shall consist of one or more operating blower units. The system shall include automatic control of auxiliary blower units to maintain the required operating pressure. This equipment shall meet the following requirements:

- (1) Blowers shall be powered by continuous-rated motors at the maximum power required.
- (2) Blowers shall have personnel protection, such as inlet screens and belt guards.
- (3) Blower systems shall be weather protected.
- (4) Blower systems shall be equipped with back-draft check dampers.
- (5) There shall be not less than two blower units, each of which has capacity to maintain full inflation pressure with normal leakage.
- (6) The blowers shall be designed to be incapable of over-pressurization.
- (7) The auxiliary blower unit(s) shall operate automatically if there is any loss of internal pressure or if an operating blower unit becomes inoperative.
- (8) The design inflation pressure and the capacity of each blower system shall be certified by a professional engineer.

11.10.5.3 Standby Power System.

11.10.5.3.1 A fully automatic standby power system shall be provided. The system shall be either an auxiliary engine generator set capable of running the blower system or a supplementary blower unit that is sized for 1 times the normal operating capacity and is powered by an internal combustion engine.

11.10.5.3.2 The standby power system shall be fully automatic to ensure continuous inflation in the event of any failure of the primary power. This system shall be capable of operating continuously for a minimum of 4 hours.

11.10.5.3.3 The sizing and capacity of the standby power system shall be certified by a professional engineer.

11.10.6 Maintenance and Operation.

11.10.6.1 Instructions in both operation and maintenance shall be transmitted to the owner by the manufacturer of the tensioned-membrane, air-supported, or air-inflated structure.

11.10.6.2 An annual inspection and required maintenance of each structure shall be performed to ensure safety conditions. At least biennially, the inspection shall be performed by a pro-

fessional engineer, registered architect, or individual certified by the manufacturer.

11.10.7 Services.

11.10.7.1 Fired Heaters.

11.10.7.1.1 Only labeled heating devices shall be used.

11.10.7.1.2 Fuel-fired heaters and their installation shall be approved by the authority having jurisdiction.

11.10.7.1.3 Containers for liquefied petroleum gases shall be installed not less than 5 ft (1.5 m) from any temporary membrane structure and shall be in accordance with the provisions of NFPA 58, *Liquefied Petroleum Gas Code*.

11.10.7.1.4 Tanks shall be secured in the upright position and protected from vehicular traffic.

11.10.7.2 Electric Heaters.

11.10.7.2.1 Only labeled heaters shall be permitted.

11.10.7.2.2 Heaters used inside a temporary membrane structure shall be approved.

11.10.7.2.3 Heaters shall be connected to electricity by electric cable that is suitable for outside use and is of sufficient size to handle the electrical load.

SECTION 11.11 TENTS

11.11.1 General.

11.11.1.1 The provisions of Section 11.1 shall apply.

11.11.1.2 Tents shall be permitted only on a temporary basis.

11.11.1.3 Tents shall be erected to cover not more than 75 percent of the premises, unless otherwise approved by the authority having jurisdiction.

11.11.2 Flame Resistance.

11.11.2.1 All tent fabric shall be flame resistant in accordance with 10.3.1.

11.11.2.2 One of the following shall serve as evidence that the tent fabric materials have the required flame resistance:

- (1) The authority having jurisdiction shall require a certificate or other evidence of acceptance by an organization acceptable to the authority having jurisdiction.
- (2) The authority having jurisdiction shall require a report of tests made by other inspection authorities or organizations acceptable to the authority having jurisdiction.

11.11.2.3 Where required by the authority having jurisdiction, confirmatory field tests shall be conducted using test specimens from the original material, which shall have been affixed at the time of manufacture to the exterior of the tent.

11.11.3 Location and Spacing.

11.11.3.1 There shall be a minimum of 10 ft (3 m) between stake lines.

11.11.3.2 Adjacent tents shall be spaced to provide an area to be used as a means of emergency egress. Where 10 ft (3 m) between

stake lines does not meet the requirements for means of egress, the distance necessary for means of egress shall govern.

Exception No. 1: Tents not occupied by the public and not used for the storage of combustible material shall be permitted to be erected less than 10 ft (3 m) from other structures where the authority having jurisdiction deems such close spacing safe from hazard to the public.

Exception No. 2: Tents, each not exceeding 1200 ft² (111.5 m²) in ground area and located in fairgrounds or similar open spaces, shall not be required to be separated from each other, provided that safety precautions meet the approval of the authority having jurisdiction.

11.11.3.3 The placement of tents relative to other structures shall be at the discretion of the authority having jurisdiction, with consideration given to occupancy, use, opening, exposure, and other similar factors.

11.11.4 Fire Hazards.

11.11.4.1 The ground enclosed by any tent, and the ground for a reasonable distance but for not less than 10 ft (3 m) outside of such a tent(s), shall be cleared of all flammable or combustible material or vegetation. This work shall be accomplished to the satisfaction of the authority having jurisdiction prior to the erection of such a tent(s). The premises shall be kept free from such flammable or combustible materials during the period for which the premises are used by the public.

Exception: Removal of flammable or combustible material shall not apply to areas used for necessary support equipment.

11.11.4.2 Where prohibited by the authority having jurisdiction, smoking shall not be permitted in any tent.

11.11.5 **Fire-Extinguishing Equipment.** Portable fire-extinguishing equipment of approved types shall be furnished and maintained in tents in such quantity and in such locations as directed by the authority having jurisdiction.

11.11.6 Services.

11.11.6.1 Fired Heaters.

11.11.6.1.1 Only labeled heating devices shall be used.

11.11.6.1.2 Fuel-fired heaters and their installation shall be approved by the authority having jurisdiction.

11.11.6.1.3 Containers for liquefied petroleum gases shall be installed not less than 5 ft (1.5 m) from any tent and shall be in accordance with the provisions of NFPA 58, *Liquefied Petroleum Gas Code*.

11.11.6.1.4 Tanks shall be secured in the upright position and protected from vehicular traffic.

11.11.6.2 Electric Heaters.

11.11.6.2.1 Only labeled heaters shall be permitted.

11.11.6.2.2 Heaters used inside a tent shall be approved.

11.11.6.2.3 Heaters shall be connected to electricity by electric cable that is suitable for outside use and is of sufficient size to handle the electrical load.

Chapter 12 NEW ASSEMBLY OCCUPANCIES

SECTION 12.1 GENERAL REQUIREMENTS

12.1.1 Application. The requirements of this chapter apply to the following:

- (1) New buildings or portions thereof used as an assembly occupancy (*see 1.4.1*)
- (2) Additions made to, or used as, an assembly occupancy (*see 4.6.6*)
- (3) Alterations, modernizations, or renovations of existing assembly occupancies (*see 4.6.7*)
- (4) Existing buildings or portions thereof upon change of occupancy to an assembly occupancy (*see 4.6.11*)

12.1.2 Mixed Occupancies. (*See also 6.1.14.*)

12.1.2.1* Any assembly occupancy and its access to exits in buildings of other occupancy, such as ballrooms in hotels, restaurants in stores, rooftop assembly occupancies, or assembly rooms in schools, shall be located, separated, or protected to avoid any undue danger to the occupants of the assembly occupancy from a fire originating in the other occupancy or smoke therefrom.

12.1.2.2 Occupancy of any room or space for assembly purposes by fewer than 50 persons in a building of other occupancy and incidental to such other occupancy shall be classified as part of the other occupancy and shall be subject to the provisions applicable thereto.

12.1.2.3 Assembly occupancies in buildings of other occupancy shall be permitted to use exits common to the assembly occupancy and the other occupancy, provided that the assembly area and the other occupancy considered separately each have exits sufficient to meet the requirements of this *Code*.

12.1.2.4* Exits shall be sufficient for simultaneous occupancy of both the assembly occupancy and other parts of the building, except where the authority having jurisdiction determines that the conditions are such that simultaneous occupancy will not occur.

12.1.2.5 Assembly and Mercantile Occupancies in Covered Mall Buildings. The provisions of Chapter 12 shall apply to the assembly occupancy tenant space. The provisions of 36.4.4 shall be permitted to be used outside the assembly occupancy tenant space.

12.1.3* Special Definitions.

Aisle Accessway. See 3.3.6.

Exhibit. See 3.3.57.

Exhibitor. See 3.3.58.

Exposition. See 3.3.64.

Exposition Facility. See 3.3.65.

Festival Seating. See 3.3.68.

Flow Time. See 3.3.83.

Fly Gallery. See 3.3.84.

Gridiron. See 3.3.90.

Legitimate Stage. See 3.3.114.

Life Safety Evaluation. See 3.3.116.

Multilevel Play Structure. See 3.3.128.

Multipurpose Assembly Occupancy. See 3.3.129.

Pinrail. See 3.3.147.

Platform. See 3.3.149.

Proscenium Wall. See 3.3.156.

Regular Stage. See 3.3.161.

Smoke-Protected Assembly Seating. See 3.3.187.

Special Amusement Building. See 3.3.188.

Stage. See 3.3.191.

Temporary Platform. See 3.3.198.

12.1.4* Classification of Occupancy. (*See 6.1.2.*)

12.1.5 Classification of Hazard of Contents. Contents of assembly occupancies shall be classified in accordance with the provisions of Section 6.2.

12.1.6 Minimum Construction Requirements. The location of an assembly occupancy shall be limited as shown in Table 12.1.6. (*See 8.2.1.*)

Exception No. 1: This requirement shall not apply to outdoor grandstands of Type I or Type II construction.

Exception No. 2: This requirement shall not apply to outdoor grandstands of Type III, Type IV, or Type V construction and in accordance with 12.4.8.

Exception No. 3: This requirement shall not apply to grandstands of noncombustible construction supported by the floor in a building meeting the construction requirements of Table 12.1.6.

Exception No. 4: This requirement shall not apply to assembly occupancies within covered mall buildings in accordance with 36.4.4.

12.1.7 Occupant Load.

12.1.7.1* The occupant load, in number of persons for whom means of egress and other provisions are required, shall be determined on the basis of the occupant load factors of Table 7.3.1.2 that are characteristic of the use of the space or shall be determined as the maximum probable population of the space under consideration, whichever is greater. In areas not in excess of 10,000 ft² (930 m²), the occupant load shall not exceed one person in 5 ft² (0.46 m²); in areas in excess of 10,000 ft² (930 m²), the occupant load shall not exceed one person in 7 ft² (0.65 m²).

12.1.7.2 Waiting Spaces. In theaters and other assembly occupancies where persons are admitted to the building at times when seats are not available, or when the permitted occupant load has been reached based on 12.1.7.1 and persons are allowed to wait in a lobby or similar space until seats or space is available, such use of a lobby or similar space shall not encroach upon the required clear width of exits. The waiting spaces shall be restricted to areas other than the required means of egress. Exits shall be provided for the waiting spaces on the basis of one person for each 3 ft² (0.28 m²) of waiting space area. Such exits shall be in addition to the exits specified for the main auditorium area and shall conform in construction and arrangement to the general rules for exits given in this chapter.

12.1.7.3 Where the occupant load of an assembly occupancy exceeds 6000, a life safety evaluation shall be performed in accordance with 12.4.1.

Table 12.1.6 Construction Type Limitations

Type of Construction	Below LED	LED	Number of Levels above LED			
			1	2	3	4
I(443) ^{†‡§} I(332) ^{†‡§} II(222) ^{†‡§}	Any assembly [◊]	Any assembly	Any assembly	Any assembly	Any assembly	Any assembly; If OL > 300 [◊]
II(111) ^{†‡§}	Any assembly [◊] Limited to 1 level below LED	Any assembly	Any assembly	Any assembly; If OL > 1000 [◊]	Assembly with OL ≤ 1000 [◊]	NP
III(211) [‡] IV(2HH) V(111)	Any assembly [◊] Limited to 1 level below LED	Any assembly	Any assembly	Any assembly; If OL > 300 [◊]	Assembly with OL ≤ 1000 [◊]	NP
II(000)	Assembly with OL ≤ 1000 [◊] Limited to 1 level below LED	Any assembly; If OL > 1000 [◊]	Assembly with OL ≤ 300 [◊]	NP	NP	NP
III(200) V(000)	Assembly with OL ≤ 1000 [◊] Limited to 1 level below LED	Assembly with OL ≤ 1000	Assembly with OL ≤ 300 [◊]	NP	NP	NP

NP: Not permitted.

LED: Level of exit discharge.

OL: Occupant load.

Note: For the purpose of this table, a mezzanine is not counted as a level.

[†]Where every part of the structural framework of roofs in Type I or Type II construction is 20 ft (6.1 m) or more above the floor immediately below, omission of all fire protection of the structural members shall be permitted, including protection of trusses, roof framing, decking, and portions of columns above 20 ft (6.1 m).

[‡]Where seating treads and risers serve as floors, such seating treads and risers shall be permitted to be of 1-hour fire resistance-rated construction. Structural members supporting seating treads and risers shall conform to the requirements of Table 12.1.6. Joints between seating tread and riser units shall be permitted to be unrated, provided that such joints do not involve separation from areas containing high hazard contents and the facility is constructed and operated in accordance with 12.4.2.

[§]In open-air fixed seating facilities, including stadia, omission of fire protection of structural members exposed to the outside atmosphere shall be permitted where substantiated by an approved engineering analysis.

[◊]Permitted if all the following are protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7:

- (1) The level of the assembly occupancy
- (2) Any level below the level of the assembly occupancy
- (3) In the case of an assembly occupancy located below the level of exit discharge, any level intervening between that level and the level of exit discharge, including the level of exit discharge

Exception: Where approved by the authority having jurisdiction, the number of usually seated occupants provided with not less than 15 ft² (1.4 m²) of lawn surface in outdoor facilities shall be permitted to be excluded in determining the need for a life safety evaluation.

SECTION 12.2 MEANS OF EGRESS REQUIREMENTS

12.2.1 General. All means of egress shall be in accordance with Chapter 7 and Section 12.2.

12.2.2 Means of Egress Components.

12.2.2.1 Components of means of egress shall be limited to the types described in 12.2.2.2 through 12.2.2.12.

12.2.2.2 Doors.

12.2.2.2.1 Doors complying with 7.2.1 shall be permitted.

12.2.2.2.2 Assembly occupancies with occupant loads of 300 or less in covered malls (*see exception to 36.4.4.1*) shall be permitted to have horizontal or vertical security grilles or doors complying with Exception No. 2 to 7.2.1.4.1 on the main entrance/exits.

12.2.2.2.3 Panic Hardware or Fire Exit Hardware. Any door in a required means of egress from an area having an occupant load of 100 or more persons 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.

Exception No. 1: In assembly occupancies having an occupant load not greater than 500, where the main exit consists of a single door or single pair of doors, locking devices complying with Exception No. 2 to 7.2.1.5.1 shall be permitted to be used on the main exit. Any latching device on such a door(s) shall be released by panic hardware.

Exception No. 2: This requirement shall not apply to delayed-egress locks as permitted in 12.2.2.2.4.

Exception No. 3: This requirement shall not apply to access-controlled egress doors as permitted in 12.2.2.2.5.

12.2.2.2.4 Delayed-egress locks complying with 7.2.1.6.1 shall be permitted on doors other than main entrance/exit doors.

12.2.2.2.5 Doors in the means of egress shall be permitted to be equipped with an approved access control system complying with 7.2.1.6.2. Doors shall not be locked from the egress side when the assembly occupancy is occupied. (*See 7.2.1.1.3.*)

12.2.2.2.6 Revolving doors complying with the requirements of 7.2.1.10 shall be permitted.

12.2.2.2.7 Turnstiles. No turnstiles or other devices that restrict the movement of persons shall be installed in any assembly occupancy in such a manner as to interfere with required means of egress facilities.

12.2.2.3 Stairs.

12.2.2.3.1 Stairs complying with 7.2.2 shall be permitted.

*Exception No. 1:** Stairs serving seating that is designed to be repositioned shall not be required to comply with 7.2.2.3.1.

Exception No. 2: This requirement shall not apply to stages and platforms as permitted by 12.4.5.

12.2.2.3.2 Catwalk, Gallery, and Gridiron Stairs.

12.2.2.3.2.1 Noncombustible grated stair treads and landing floors shall be permitted in means of egress from lighting and access catwalks, galleries, and gridirons.

12.2.2.3.2.2 Spiral stairs complying with 7.2.2.2.3 shall be permitted in means of egress from lighting and access catwalks, galleries, and gridirons.

12.2.2.4 Smokeproof Enclosures. Smokeproof enclosures complying with 7.2.3 shall be permitted.

12.2.2.5 Horizontal Exits. Horizontal exits complying with 7.2.4 shall be permitted.

12.2.2.6 Ramps. Ramps complying with 7.2.5 shall be permitted.

Exception: Ramps not part of an accessible means of egress and serving only stages or nonpublic areas and ramped aisles shall be permitted to have a slope not steeper than 1 in 8.

12.2.2.7 Exit Passageways. Exit passageways complying with 7.2.6 shall be permitted.

12.2.2.8 (Reserved.)

12.2.2.9 (Reserved.)

12.2.2.10 Fire Escape Ladders. Fire escape ladders complying with 7.2.9 shall be permitted.

12.2.2.11 Alternating Tread Devices. Alternating tread devices complying with 7.2.11 shall be permitted.

12.2.2.12 Areas of Refuge. Areas of refuge complying with 7.2.12 shall be permitted.

12.2.3 Capacity of Means of Egress.

12.2.3.1 The capacity of means of egress shall be in accordance with Section 7.3 or shall be in accordance with 12.2.3.2 for means of egress serving theater-type seating or similar seating arranged in rows.

12.2.3.2 Minimum clear widths of aisles and other means of egress serving theater-type seating, or similar seating arranged in rows, shall be in accordance with Table 12.2.3.2. The minimum clear widths shown shall be modified in accordance with all of the following:

- (1) If risers exceed 7 in. (17.8 cm) in height, multiply the stair width in Table 12.2.3.2 by factor A, where

$$A = 1 + \frac{\text{riser height} - 7 \text{ in.}}{5}$$

- (2) Stairs without a handrail located within a 30-in. (76-cm) horizontal distance shall be 25 percent wider than otherwise calculated, that is, multiply by factor $B = 1.25$.
- (3) Ramps steeper than 1 in 10 slope where used in ascent shall have their widths increased by 10 percent, that is, multiply by factor $C = 1.10$.

Exception No. 1: This requirement shall not apply to lighting and access catwalks as permitted by 12.4.5.9.

Exception No. 2: This requirement shall not apply to grandstands and folding and telescopic seating as permitted by 12.4.8 and 12.4.9.

Table 12.2.3.2 Capacity Factors

Number of Seats	Nominal Flow Time (sec)	Inch of Clear Width per Seat Served	
		Stairs	Passageways, Ramps, and Doorways
Unlimited	200	0.300AB	0.220C

Note: For SI units, 1 in. = 2.54 cm.

12.2.3.3 Main Entrance/Exit. Every assembly occupancy shall be provided with a main entrance/exit. The main entrance/exit shall be of sufficient width to accommodate one-half of the total occupant load and shall be at the level of exit discharge or shall connect to a stairway or ramp leading to a street. Each level of an assembly occupancy shall have access to the main entrance/exit, and such access shall have sufficient capacity to accommodate 50 percent of the occupant load of such levels. Where the main entrance/exit from an assembly occupancy is through a lobby or foyer, the aggregate capacity of all exits from the lobby or foyer shall be permitted to provide the required capacity of the main entrance/exit, regardless of whether all such exits serve as entrances to the building.

Exception No. 1: A bowling establishment shall have a main entrance/exit of sufficient capacity to accommodate 50 percent of the total occupant load without regard to the number of aisles that it serves.

*Exception No. 2:** In assembly occupancies where there is no well-defined main entrance/exit, exits shall be permitted to be distributed around the perimeter of the building, provided that the total exit width furnishes not less than 100 percent of the width needed to accommodate the permitted occupant load.

12.2.3.4 Other Exits. Each level of an assembly occupancy shall have access to the main entrance/exit and shall be provided with additional exits of sufficient width to accommodate not less than one-half of the total occupant load served by that level. Such exits shall discharge in accordance with 12.2.7. Such exits shall be located as far apart as practicable and as far from the main entrance/exit as practicable. The exits shall be accessible from a cross aisle or a side aisle. (See 12.2.3.3.)

Exception: In assembly occupancies where there is no well-defined main entrance/exit, exits shall be permitted to be distributed around the perimeter of the building, provided that the total exit width furnishes not less than 100 percent of the width required to accommodate the permitted occupant load.

12.2.3.5 The width of any exit access corridor serving 50 or more persons shall be not less than 44 in. (112 cm).

12.2.4* Number of Exits.

12.2.4.1 The number of exits shall be in accordance with Section 7.4, other than exits for fenced outdoor assembly occupancies in accordance with 12.2.4.2.

12.2.4.2 A fenced outdoor assembly occupancy shall have not less than two widely separated means of egress from the enclosure. If more than 6000 persons are to be served by such means of egress, there shall be not less than three means of egress; if more than 9000 persons are to be served, there shall be not less than four means of egress.

12.2.4.3 Balconies or mezzanines having an occupant load not exceeding 50 shall be permitted to be served by a single means of egress, and such means of egress shall be permitted to lead to the floor below.

12.2.4.4 Balconies or mezzanines having an occupant load exceeding 50 but not exceeding 100 shall have not less than two remote means of egress, but both such means of egress shall be permitted to lead to the floor below.

12.2.4.5 Balconies or mezzanines having an occupant load exceeding 100 shall have means of egress as described in 7.4.1.

12.2.4.6 A second means of egress shall not be required from lighting and access catwalks, galleries, and gridirons where a means of escape to a floor or a roof is provided. Ladders, alternating tread devices, or spiral stairs shall be permitted in such means of escape.

12.2.5 Arrangement of Means of Egress. (See also Section 7.5.)

12.2.5.1 Exits shall be located remotely from each other and shall be arranged to minimize the possibility that they might be blocked by any emergency.

Exception: A common path of travel shall be permitted for the first 20 ft (6.1 m) from any point where serving any number of occupants and for the first 75 ft (23 m) from any point where serving not more than 50 occupants.

12.2.5.2 Means of egress shall not be permitted through kitchens, storerooms, restrooms, closets, or hazardous areas as described in 12.3.2.

12.2.5.3 Where the floor area of auditoriums and arenas is used for assembly occupancy activities/events, not less than 50 percent of the occupant load shall have means of egress provided without passing through adjacent fixed seating areas.

12.2.5.4 General Requirements for Access and Egress Routes Within Assembly Areas.

12.2.5.4.1 Festival seating shall be prohibited within a building. (See definition in 3.3.68.)

Exception No. 1: Festival seating shall be permitted in assembly occupancies having occupant loads of 1000 or less.

Exception No. 2: Festival seating shall be permitted in assembly occupancies where occupant loads exceed 1000 and where an approved life safety evaluation has been performed. (See 12.4.1.)

12.2.5.4.2* Access and egress routes shall be maintained so that any individual is able to move without undue hindrance, on personal initiative and at any time, from an occupied position to the exits.

12.2.5.4.3* Access and egress routes shall be maintained so that crowd management, security, and emergency medical personnel are able to reach any individual at any time, without undue hindrance.

12.2.5.4.4* The width of aisle accessways and aisles shall provide sufficient egress capacity for the number of persons accommodated by the catchment area served by the aisle accessway or aisle in accordance with 12.2.3.1. Where aisle accessways or aisles converge to form a single path of egress travel, the required egress capacity of that path shall not be less than the combined required capacity of the converging aisle accessways and aisles.

12.2.5.4.5 Those portions of aisle accessways and aisles where egress is possible in either of two directions shall be uniform in required width.

Exception: This requirement shall not apply to those portions of aisle accessways where the required width, not including the seat space described by 12.2.5.7.2, does not exceed 12 in. (30.5 cm).

12.2.5.4.6 In the case of side boundaries for aisle accessways or aisles, other than those for nonfixed seating at tables, the clear width shall be measured to boundary elements such as walls, guardrails, handrails, edges of seating, tables, and side edges of treads. The measurement shall be made horizontally to the vertical projection of the elements, resulting in the smallest width measured perpendicularly to the line of travel.

12.2.5.5* Aisle Accessways Serving Seating Not at Tables.

12.2.5.5.1* To determine the required clear width of aisle accessways between rows of seating, horizontal measurements shall be made, between vertical planes, from the back of one seat to the front of the most forward projection of the seat immediately behind it. Where the entire row consists of automatic or self-rising seats that comply with ASTM F 851, *Test Method for Self-Rising Seat Mechanisms*, the measurement shall be permitted to be made with the seats in the up position.

12.2.5.5.2 The aisle accessway between rows of seating shall have a clear width of not less than 12 in. (30.5 cm), and this minimum shall be increased as a function of row length in accordance with 12.2.5.5.3 and 12.2.5.5.4.

Exception No. 1: If used by not more than four persons, there shall be no minimum clear width requirement for the portion of the aisle accessway having a length not exceeding 6 ft (1.8 m), measured from the center of the seat farthest from the aisle.

Exception No. 2: The number of seats between the farthest seat and an aisle in grandstands, bleachers, and folding and telescopic seating shall not exceed that shown in Table 12.2.5.5.2.

Table 12.2.5.5.2 Maximum Number of Seats Between Farthest Seat and an Aisle

Application	Outdoors	Indoors
Grandstands	11	6
Bleachers (see 12.2.5.6.1, Exception No. 1)	20	9

12.2.5.5.3* Rows of seating served by aisles or doorways at both ends shall not exceed 100 seats per row. The 12-in. (30.5-cm) minimum clear width of aisle accessway between such rows shall be increased by 0.3 in. (0.8 cm) for every seat over a total of 14 but shall not be required to exceed 22 in. (55.9 cm).

Exception: This requirement shall not apply to smoke-protected assembly seating as permitted by 12.4.2.4.

12.2.5.5.4 Rows of seating served by an aisle or doorway at one end only shall have a path of travel not exceeding 30 ft (9.1 m) in length from any seat to an aisle. The 12-in. (30.5-cm) minimum clear width of aisle accessway between such rows shall be increased by 0.6 in. (1.6 cm) for every seat over a total of seven.

Exception: This requirement shall not apply to smoke-protected assembly seating as permitted by 12.4.2.5 and 12.4.2.6.

12.2.5.5.5 Rows of seating using tablet-arm chairs shall be permitted only if the clear width of aisle accessways complies with the requirements of 12.2.5.6 where the tablet is in the usable position.

Exception: Tablet arms shall be permitted to be measured in the stored position where the tablet arm automatically returns to the stored position when raised manually to a vertical position in one motion and falls to the stored position by force of gravity.

12.2.5.5.6 The depth of seat boards shall not be less than 9 in. (23 cm) where the same level is not used for both seat boards and footboards. Footboards, independent of seats, shall be provided so that there is no horizontal opening that allows the passage of a $1/2$ -in. (1.3-cm) diameter sphere.

12.2.5.6 Aisles Serving Seating Not at Tables.

12.2.5.6.1 Aisles shall be provided so that the number of seats served by the nearest aisle is in accordance with 12.2.5.5.2 through 12.2.5.5.4.

Exception No. 1: Aisles shall not be required in bleachers, provided that all of the following conditions are met.

(a) Egress from the front row shall not be obstructed by a rail, a guard, or other obstruction.

(b) The row spacing shall be 28 in. (71.1 cm) or less.

(c) The rise per row, including the first row, shall be 6 in. (15.2 cm) or less.

(d) The number of rows shall not exceed 16.

(e) The seat spaces shall not be physically defined.

(f) Seat boards that are also used as stepping surfaces for descent shall provide a walking surface with a width not less than 12 in. (30.5 cm), and, where there is a depressed footboard, the gap between seat boards of adjacent rows shall not exceed 12 in. (30.5 cm), measured horizontally. Leading edges of such surfaces shall be provided with a contrasting marking stripe so that the location of such leading edge is readily apparent, particularly where viewed in descent. Such stripe shall be not less than 1 in. (2.5 cm) wide and shall not exceed 2 in. (5.1 cm) in width. The marking stripe shall not be required where bleacher surfaces and environmental conditions, under all conditions of use, are such that the location of each leading edge is readily apparent, particularly when viewed in descent.

Exception No. 2: In seating composed entirely of bleachers for which the row-to-row dimension is 28 in. (71 cm) or less, and from which front egress is not limited, aisles shall not be required to exceed 66 in. (168 cm) in width. Such aisles shall not be considered as dead-end aisles.

12.2.5.6.2 Dead-end aisles shall not exceed 20 ft (6.1 m) in length.

Exception No. 1: A longer dead-end aisle shall be permitted where seats served by the dead-end aisle are not more than 24 seats from another aisle, measured along a row of seats having a clear width of not less than 12 in. (30.5 cm) plus 0.6 in. (1.5 cm) for each additional seat over a total of seven in the row.

Exception No. 2: A 16-row, dead-end aisle shall be permitted in folding and telescopic seating and grandstands.

12.2.5.6.3* The minimum clear width of aisles shall be sufficient to provide egress capacity in accordance with 12.2.3.2 but shall be not less than the following:

- (1) 48 in. (122 cm) for stairs having seating on each side, or 36 in. (91 cm) where aisle does not serve more than 50 seats
- (2) 36 in. (91 cm) for stairs having seating on only one side
- (3) 23 in. (58 cm) between a handrail and seating, or between a guardrail and seating where the aisle is subdivided by a handrail
- (4) 42 in. (107 cm) for level or ramped aisles having seating on both sides, or 36 in. (91 cm) where aisle does not serve more than 50 seats
- (5) 36 in. (91 cm) for level or ramped aisles having seating on only one side
- (6) 23 in. (58 cm) between a handrail or guardrail and seating where the aisle does not serve more than five rows on one side

12.2.5.6.4* Aisle Stairs and Ramps. Aisles having a gradient steeper than 1 in 20, but not steeper than 1 in 8, shall consist of a ramp. Aisles having a gradient steeper than 1 in 8 shall consist of an aisle stair. The exception to 12.2.5.6.8 shall not apply.

Exception No. 1: Aisles in folding and telescopic seating shall be permitted to be stepped aisles.

Exception No. 2: The limitation on height between landings in Tables 7.2.2.1(a) and (b) shall not apply to aisle stairs.

12.2.5.6.5 Aisle Stair Treads. Aisle stair treads shall meet the following criteria:

- (1) There shall be no variation in the depth of adjacent treads that exceeds $3/16$ in. (0.5 cm).
- (2) *Treads shall be not less than 11 in. (27.9 cm).
- (3) All treads shall extend the full width of the aisle.

12.2.5.6.6 Aisle Stair Risers. Aisle stair risers shall meet the following criteria:

- (1) Riser heights shall be not less than 4 in. (10.2 cm).

Exception: The riser height of aisle stairs in folding and telescopic seating shall be permitted to be not less than $3\frac{1}{2}$ in. (8.9 cm) and shall not exceed 11 in. (27.9 cm).

- (2) Riser heights shall not exceed 8 in. (20.3 cm).

Exception No. 1: Where the gradient of an aisle is steeper than 8 in. (20.3 cm) in rise in 11 in. (27.9 cm) of run to maintain necessary sight lines in the adjoining seating area, the riser height shall be permitted to exceed 8 in. (20.3 cm) but shall not exceed 9 in. (22.9 cm).

Exception No. 2: The riser height of aisle stairs in folding and telescopic seating shall be permitted to be not less than $3\frac{1}{2}$ in. (8.9 cm) and shall not exceed 11 in. (27.9 cm).

- (3) Riser heights shall be designed to be uniform in each aisle, and the construction-caused nonuniformities shall not exceed $3/16$ in. (0.5 cm) between adjacent risers.

Exception: Riser height shall be permitted to be nonuniform only for the purpose of accommodating changes in gradient necessary to maintain sight lines within a seating area and shall be permitted to exceed $3/16$ in. (0.5 cm) in any flight. Where nonuniformities exceed $3/16$ in. (0.5 cm) between adjacent risers, the exact location of such nonuniformities shall be indicated on the drawings.

ities shall be indicated by a distinctive marking stripe on each tread at the nosing or leading edge adjacent to the nonuniform risers.

12.2.5.6.7* Aisle Handrails. Ramped aisles having a gradient exceeding 1 in 12 and aisle stairs shall be provided with handrails at one side or along the centerline and in accordance with 7.2.2.4.5(1), (2), and (3).

Where seating exists on both sides of the aisle, the handrails shall be noncontinuous with gaps or breaks at intervals not exceeding five rows to facilitate access to seating and to allow crossing from one side of the aisle to the other. These gaps or breaks shall have a clear width of not less than 22 in. (55.9 cm) and shall not exceed 36 in. (91 cm), measured horizontally, and the handrail shall have rounded terminations or bends. Where handrails are provided in the middle of aisle stairs, an additional intermediate rail shall be located approximately 12 in. (30 cm) below the main handrail.

Exception No. 1: Handrails shall not be required for ramped aisles having a gradient not steeper than 1 in 8 and having seating on both sides.

Exception No. 2: The requirement for a handrail shall be satisfied by the use of a guard providing a rail that complies with the graspability requirements for handrails and shall be located at a consistent height between 34 in. and 42 in. (86 cm and 107 cm), measured vertically from the top of the rail to the leading edge (nosing) of stair treads or to the adjacent walking surface in the case of a ramp.

12.2.5.6.8* Aisle Marking. A contrasting marking stripe shall be provided on each tread at the nosing or leading edge so that the location of such tread is readily apparent, particularly when viewed in descent. Such stripes shall be not less than 1 in. (2.5 cm) wide and shall not exceed 2 in. (5 cm) in width.

Exception: The marking stripe shall not be required where tread surfaces and environmental conditions, under all conditions of use, are such that the location of each tread is readily apparent, particularly when viewed in descent.

12.2.5.7* Aisle Accessways Serving Seating at Tables.

12.2.5.7.1 The required clear width of an aisle accessway shall be not less than 12 in. (30.5 cm) where measured in accordance with 12.2.5.7.2 and shall be increased as a function of length in accordance with 12.2.5.7.3.

Exception: If used by not more than four persons, no minimum clear width shall be required for the portion of aisle accessway having a length not exceeding 6 ft (1.8 m) and located farthest from an aisle.*

12.2.5.7.2* Where nonfixed seating is located between a table and an aisle accessway or aisle, the measurement of required clear width of the aisle accessway or aisle shall be made to a line 19 in. (48.3 cm) away from the edge of the table. The 19-in. (48.3-cm) distance shall be measured perpendicularly to the edge of the table.

12.2.5.7.3* The minimum required clear width of an aisle accessway, measured in accordance with 12.2.5.4.6 and 12.2.5.7.2, shall be increased beyond the 12-in. (30.5-cm) requirement of 12.2.5.7.1 by 0.5 in. (1.3 cm) for each additional 12 in. (30.5 cm) or fraction thereof beyond 12 ft (3.7 m) of aisle accessway length, where measured from the center of the seat farthest from an aisle.

12.2.5.7.4 The path of travel along the aisle accessway shall not exceed 36 ft (10.9 m) from any seat to the closest aisle or egress doorway.

12.2.5.8 Aisles Serving Seating at Tables.

12.2.5.8.1* Aisles that contain steps or that are ramped, such as aisles serving dinner theater-style configurations, shall comply with the requirements of 12.2.5.6.

12.2.5.8.2* The width of aisles serving seating at tables shall be not less than 44 in. (112 cm) where serving an occupant load exceeding 50, and 36 in. (91 cm) where serving an occupant load of 50 or fewer.

12.2.5.8.3* Where nonfixed seating is located between a table and an aisle, the measurement of required clear width of the aisle shall be made to a line 19 in. (48.3 cm) away from the edge of the table. The 19-in. (48.3-cm) distance shall be measured perpendicularly to the edge of the table.

12.2.5.9 Approval of Layouts. Where required by the authority having jurisdiction, plans drawn to scale showing the arrangement of furnishings or equipment shall be submitted to the authority by the building owner, manager, or authorized agent to substantiate conformance with the provisions of 12.2.5. Such plans shall constitute the only acceptable arrangement until revised or until additional plans are submitted and approved.

Exception: Temporary deviations from the specifications of the approved plans shall be permitted, provided that the occupant load is not increased and the intent of 12.2.5.9 is maintained.

12.2.6 Travel Distance to Exits. Exits shall be arranged so that the total length of travel from any point to reach an exit shall not exceed 150 ft (45 m) in any assembly occupancy.

Exception No. 1: The travel distance shall not exceed 200 ft (60 m) in assembly occupancies protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

Exception No. 2: This requirement shall not apply to smoke-protected assembly seating as permitted by 12.4.2.8 and its exception.

12.2.7 Discharge from Exits.

12.2.7.1 Exit discharge shall comply with Section 7.7.

12.2.7.2 The level of exit discharge shall be measured at the point of principal entrance to the building.

12.2.7.3 Where the principal entrance to an assembly occupancy is via a terrace, either raised or depressed, such terrace shall be permitted to be considered to be the level of exit discharge for the purposes of Table 12.1.6 where the following criteria are met:

- (1) The terrace is at least as long, measured parallel to the building, as the total width of the exit(s) it serves, but not less than 5 ft (1.5 m) long.
- (2) The terrace is at least as wide, measured perpendicularly to the building, as the exit(s) it serves, but not less than 10 ft (3 m) wide.
- (3) Required stairs leading from the terrace to grade are protected in accordance with 7.2.2.6.3 or are not less than 10 ft (3 m) from the building.

12.2.8 Illumination of Means of Egress. Means of egress, other than for private party tents not exceeding 1200 ft² (111.5 m²), shall be illuminated in accordance with Section 7.8.

12.2.9 Emergency Lighting. Emergency lighting shall be provided in accordance with Section 7.9. Private party tents not exceeding 1200 ft² (111.5 m²) shall not be required to have emergency lighting.

12.2.10 Marking of Means of Egress. Means of egress shall have signs in accordance with Section 7.10.

Exception: Exit markings shall not be required on the seating side of vomitories from seating areas where exit marking is provided in the concourse and where such marking is readily apparent from the vomitories.

12.2.11 Special Means of Egress Features.

12.2.11.1 Guards and Railings.

12.2.11.1.1* Sightline-Constrained Rail Heights. Unless subject to the requirements of 12.2.11.1.2, a fasciae or railing system complying with the guard requirements of 7.2.2.4 and having a height of not less than 26 in. (66 cm) shall be provided where the floor or footboard elevation is more than 30 in. (76 cm) above the floor or grade below and where the fasciae or railing system would otherwise interfere with the sightlines of immediately adjacent seating.

12.2.11.1.2 At Foot of Aisles. A fasciae or railing system complying with the guard requirements of 7.2.2.4 shall be provided for the full width of the aisle where the foot of the aisle is more than 30 in. (76 cm) above the floor or grade below. The fasciae or railing shall be not less than 36 in. (91 cm) high and shall provide not less than 42 in. (107 cm), measured diagonally, between the top of the rail and the nosing of the nearest tread.

12.2.11.1.3 At Cross Aisles. Guards and railings at cross aisles shall meet the following criteria:

- (1) Cross aisles located behind seating rows shall be provided with railings not less than 26 in. (66 cm) above the adjacent floor of the aisle.

Exception: The requirement of 12.2.11.1.3(1) shall not apply where the backs of seats located at the front of the aisle project 24 in. (61 cm) or more above the adjacent floor of the aisle.

- (2) Where cross aisles exceed 30 in. (76 cm) above the floor or grade below, guards shall be provided in accordance with 7.2.2.4.

12.2.11.1.4 At Side and Back of Seating Areas. Guards complying with the guard requirements of 7.2.2.4 shall be provided with a height not less than 42 in. (107 cm) above the aisle, aisle accessway, or footboard where the floor elevation exceeds 30 in. (76 cm) above the floor or grade to the side or back of seating.

12.2.11.1.5 Below Seating. Openings between footboards and seat boards shall be provided with intermediate construction so that a 4-in. (10.2-cm) diameter sphere cannot pass through the opening.

12.2.11.1.6 Locations Not Requiring Guards. Guards shall not be required in the following locations:

- (1) Guards shall not be required on the audience side of stages, of raised platforms, and of other raised floor areas such as runways, ramps, and side stages used for entertainment or presentations.
- (2) Permanent guards shall not be required at vertical openings in the performance area of stages.
- (3) Guards shall not be required where the side of an elevated walking surface is required to be open for the normal functioning of special lighting or for access and use of other special equipment.

SECTION 12.3 PROTECTION

12.3.1 Protection of Vertical Openings. Any vertical opening shall be enclosed or protected in accordance with 8.2.5.

Exception No. 1: Stairs or ramps shall be permitted to be unenclosed between balconies or mezzanines and main assembly areas located below, provided that the balcony or mezzanine is open to the main assembly area.*

Exception No. 2: Exit access stairs from lighting and access catwalks, galleries, and gridirons shall not be required to be enclosed.

Exception No. 3: Assembly occupancies protected by an approved, supervised automatic sprinkler system in accordance with Section 9.7 shall be permitted to have unprotected vertical openings in accordance with 8.2.5.8.

12.3.2 Protection from Hazards.

12.3.2.1 Service Equipment, Hazardous Operations or Processes, and Storage Facilities.

12.3.2.1.1 Rooms containing high-pressure boilers, refrigerating machinery of other than the domestic refrigerator type, large transformers, or other service equipment subject to explosion shall not be located directly under or abutting required exits. All such rooms shall be separated from other parts of the building by fire barriers in accordance with 8.2.3 that have a fire resistance rating of not less than 1 hour or shall be protected by automatic extinguishing systems in accordance with Section 8.4.

12.3.2.1.2 Vents to the outside air shall be provided in accordance with Section 8.4.

12.3.2.1.3 Rooms or spaces for the storage, processing, or use of materials specified in 12.3.2.1.3(1) through (3) shall be protected in accordance with the following:

- (1) Separation from the remainder of the building by fire barriers having a fire resistance rating of not less than 1 hour or protection of such rooms by automatic extinguishing systems as specified in Section 8.4 in the following areas:
 - a. Boiler and furnace rooms

Exception: The requirement of 12.3.2.1.3(1)a shall not apply to rooms enclosing furnaces, heating and air-handling equipment, or compressor equipment with a total aggregate input rating less than 200,000 Btu. Such rooms shall not be used for storage unless otherwise protected as required. For installations in attics, the draftstopping requirements of 8.2.7.1(2) shall apply.

- b. Rooms or spaces used for the storage of combustible supplies in quantities deemed hazardous by the authority having jurisdiction
- c. Rooms or spaces used for the storage of hazardous materials or flammable or combustible liquids in quantities deemed hazardous by recognized standards
- (2) Separation from the remainder of the building by fire barriers having a fire resistance rating of not less than 1 hour and protection of such rooms by automatic extinguishing systems as specified in Section 8.4 in the following areas:
 - a. Laundries
 - b. Maintenance shops, including woodworking and painting areas
 - c. Rooms or spaces used for processing or use of combustible supplies deemed hazardous by the authority having jurisdiction

- d. Rooms or spaces used for processing or use of hazardous materials or flammable or combustible liquids in quantities deemed hazardous by recognized standards
- (3) Where automatic extinguishing is used to meet the requirements of 12.3.2, the protection shall be permitted to be in accordance with 9.7.1.2.

12.3.3 Interior Finish.

12.3.3.1 Interior finish shall be in accordance with Section 10.2.

12.3.3.2 Interior wall and ceiling finish materials complying with 10.2.3 shall be Class A or Class B in all corridors and lobbies and shall be Class A in enclosed stairways.

12.3.3.3 Interior wall and ceiling finish materials complying with 10.2.3 shall be Class A or Class B in general assembly areas having occupant loads of more than 300 and shall be Class A, Class B, or Class C in assembly areas having occupant loads of 300 or fewer.

12.3.3.4 Screens on which pictures are projected shall comply with requirements of Class A or Class B interior finish in accordance with 10.2.3.

12.3.3.5 Interior Floor Finish. (No requirements.)

12.3.4 Detection, Alarm, and Communications Systems.

12.3.4.1 General. Assembly occupancies with occupant loads of more than 300 and all theaters with more than one audience-viewing room shall be provided with an approved fire alarm system in accordance with 9.6.1 and 12.3.4.

Exception No. 1: Assembly occupancies that are a part of a mixed occupancy (see 6.1.14) shall be permitted to be served by a common fire alarm system, provided that the individual requirements of each occupancy are met.

Exception No. 2: Voice communication or public address systems complying with 12.3.4.3.3 shall not be required to comply with 9.6.1.

12.3.4.2 Initiation.

12.3.4.2.1 Initiation of the required fire alarm system shall be by manual means in accordance with 9.6.2.1(1), and the system shall be provided with an emergency power source. The initiating device shall be capable of transmitting an alarm to a receiving station, located within the building, that is constantly attended when the assembly occupancy is occupied.

Exception No. 1: This requirement shall not apply to fire alarm systems initiated by means of an approved automatic fire detection system in accordance with 9.6.2.1(2) that provides fire detection throughout the building.

Exception No. 2: This requirement shall not apply to fire alarm systems initiated by means of an approved automatic sprinkler system in accordance with 9.6.2.1(3) that provides fire detection and protection throughout the building.

12.3.4.2.2* In assembly occupancies with occupant loads of more than 300, automatic detection shall be provided in all hazardous areas that are not normally occupied, unless such areas are protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

12.3.4.3 Notification.

12.3.4.3.1 The required fire alarm system shall sound an audible alarm in a constantly attended receiving station within the building when occupied for purposes of initiating emergency

action. Positive alarm sequence in accordance with 9.6.3.4 shall be permitted.

12.3.4.3.2 Occupant notification shall be by means of visible signals and voice announcements, either live or prerecorded, initiated by the person in the constantly attended location.

12.3.4.3.3 The announcement shall be made via an approved voice communication or public address system, provided with an emergency power source, that is audible above the ambient noise level of the assembly occupancy.

12.3.4.3.4 Where the authority having jurisdiction determines that a constantly attended location is impractical, a fire alarm system in accordance with Section 9.6 shall be used that meets the following criteria:

- (1) It shall be initiated by manual fire alarm boxes in accordance with 9.6.2.1(1) or other approved means.
- (2) It shall automatically provide prerecorded evacuation instructions in accordance with 9.6.3.10.

12.3.5 Extinguishment Requirements. Buildings containing assembly occupancies with occupant loads of more than 300 shall be protected by an approved, supervised automatic sprinkler system in accordance with Section 9.7 as follows (*see also 12.1.6, 12.2.6, 12.3.2, and 12.3.6*):

- (1) Throughout the story containing the assembly occupancy
- (2) Throughout all stories below the story containing the assembly occupancy
- (3) In the case of an assembly occupancy located below the level of exit discharge, throughout all stories intervening between that story and the level of exit discharge, including the level of exit discharge

Exception No. 1: This requirement shall not apply to assembly occupancies used primarily for worship with fixed seating and not part of a mixed occupancy. (See 6.1.14.)

Exception No. 2: This requirement shall not apply to assembly occupancies consisting of a single multipurpose room of less than 12,000 ft² (1100 m²) that are not used for exhibition or display and are not part of a mixed occupancy.*

Exception No. 3: This requirement shall not apply to gymnasiums, skating rinks, and swimming pools used exclusively for participant sports with no audience facilities for more than 300 persons.

Exception No. 4: In stadia and arenas, sprinklers shall be permitted to be omitted over the floor area used for contest, performance, or entertainment; over the seating areas; and over open-air concourses where an approved engineering analysis substantiates the ineffectiveness of the sprinkler protection due to building height and combustible loading.

Exception No. 5: In unenclosed stadia and arenas, sprinklers shall be permitted to be omitted in the following areas:

- (a) Press boxes less than 1000 ft² (93 m²)
- (b) Storage facilities less than 1000 ft² (93 m²) if enclosed with not less than 1-hour fire resistance-rated construction
- (c) Enclosed areas underneath grandstands that comply with 12.4.8.5

12.3.6 Corridors. Interior corridors and lobbies shall be constructed in accordance with 7.1.3.1 and 8.2.3.

Exception No. 1: Corridor and lobby protection shall not be required where assembly rooms served by the corridor or lobby have at least 50 percent of their exit capacity discharging directly to the outside, independent of corridors and lobbies.

Exception No. 2: Corridor and lobby protection shall not be required in buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

Exception No. 3: Lobbies serving only one assembly area that meet the requirements for intervening rooms (see 7.5.1.7) shall not be required to have a fire resistance rating.

Exception No. 4: Where the corridor ceiling is an assembly having a 1-hour fire resistance rating where tested as a wall, the corridor walls shall be permitted to terminate at the corridor ceiling.

SECTION 12.4 SPECIAL PROVISIONS

12.4.1 Life Safety Evaluation.

12.4.1.1* Where a life safety evaluation is required by other provisions of the *Code*, it shall be performed by persons acceptable to the authority having jurisdiction. The life safety evaluation shall include a written assessment of safety measures for conditions listed in 12.4.1.2. The life safety evaluation shall be approved annually by the authority having jurisdiction and shall be updated for special or unusual conditions.

12.4.1.2 Life safety evaluations shall include an assessment of the following conditions and related appropriate safety measures:

- (1) Nature of the events and the participants and attendees
- (2) Access and egress movement, including crowd density problems
- (3) Medical emergencies
- (4) Fire hazards
- (5) Permanent and temporary structural systems
- (6) Severe weather conditions
- (7) Earthquakes
- (8) Civil or other disturbances
- (9) Hazardous materials incidents within and near the facility
- (10) Relationships among facility management, event participants, emergency response agencies, and others having a role in the events accommodated in the facility

12.4.1.3* Life safety evaluations shall include assessments of both building systems and management features upon which reliance is placed for the safety of facility occupants. Such assessments shall consider scenarios appropriate to the facility.

12.4.2* Smoke-Protected Assembly Seating.

12.4.2.1 Fire Protection Requirements. To be considered smoke protected, an assembly seating facility shall comply with the following:

- (1) All enclosed areas with walls and ceilings in buildings or structures containing smoke-protected assembly seating shall be protected with an approved, supervised automatic sprinkler system in accordance with Section 9.7.

Exception No. 1: The requirement of 12.4.2.1(1) shall not apply to the floor area used for the contest, performance, or entertainment, provided that the roof construction is more than 50 ft (15 m) above the floor level and use is restricted to low fire hazard uses.

Exception No. 2: Sprinklers required by 12.4.2.1(1) shall be permitted to be omitted over the floor area used for contest, performance, or entertainment and over the seating areas where an approved engineering analysis substantiates the ineffectiveness of the sprinkler protection due to building height and combustible loading.*

- (2) All means of egress serving a smoke-protected assembly seating area shall be provided with smoke-actuated ventilation facilities or natural ventilation designed to maintain the level of smoke at not less than 6 ft (1.8 m) above the floor of the means of egress.

12.4.2.2 Life Safety Evaluation. To use the provisions of smoke-protected assembly seating, a facility shall be subject to a life safety evaluation in accordance with 12.4.1.

12.4.2.3 Where using Table 12.4.2.3, the number of seats specified shall be within a single assembly space, and interpolation shall be permitted between the specific values shown. The minimum clear widths shown shall be modified in accordance with all of the following:

- (1) If risers exceed 7 in. (17.8 cm) in height, multiply the stair width in Table 12.4.2.3 by factor *A*, where

$$A = 1 + \frac{(\text{riser height} - 7 \text{ in.})}{5}$$
- (2) Stairs without a handrail located within a 30-in. (76-cm) horizontal distance shall be 25 percent wider than otherwise calculated, that is, multiply by factor *B* = 1.25.
- (3) Ramps steeper than 1 in 10 slope where used in ascent shall have their widths increased by 10 percent, that is, multiply by factor *C* = 1.10.

Table 12.4.2.3 Capacity Factors

Number of Seats	Nominal Flow Time (sec)	Inch of Clear Width per Seat Served	
		Stairs	Passageways, Ramps, and Doorways
2,000	200	0.300 <i>AB</i>	0.200 <i>C</i>
5,000	260	0.200 <i>AB</i>	0.150 <i>C</i>
10,000	360	0.130 <i>AB</i>	0.100 <i>C</i>
15,000	460	0.096 <i>AB</i>	0.070 <i>C</i>
20,000	560	0.076 <i>AB</i>	0.056 <i>C</i>
25,000 or more	600	0.060 <i>AB</i>	0.044 <i>C</i>

Note: For SI units, 1 in. = 2.54 cm.

12.4.2.4 Where smoke-protected assembly seating conforms to the requirements of 12.4.2, for rows of seats served by aisles or doorways at both ends, the number of seats per row shall not exceed 100, and the clear width of not less than 12 in. (305 cm) for aisle accessways shall be increased by 0.3 in. (0.8 cm) for every additional seat beyond the number stipulated in Table 12.4.2.4; however, the minimum clear width shall not be required to exceed 22 in. (55.9 cm).

12.4.2.5 Where smoke-protected assembly seating conforms to the requirements of 12.4.2, for rows of seats served by an aisle or doorway at one end only, the aisle accessway clear width of not less than 12 in. (30.5 cm) shall be increased by 0.6 in. (1.6 cm) for every additional seat beyond the number stipulated in Table 12.4.2.4; however, the minimum clear width shall not be required to exceed 22 in. (55.9 cm).

Table 12.4.2.4 Smoke-Protected Assembly Seating

Total Number of Seats in the Space	Number of Seats per Row Permitted to Have a Clear Width Aisle Accessway of Not Less than 12 in. (30.5 cm)	
	Aisle or Doorway at Both Ends of Row	Aisle or Doorway at One End of Row
<4,000	14	7
4,000–6,999	15	7
7,000–9,999	16	8
10,000–12,999	17	8
13,000–15,999	18	9
16,000–18,999	19	9
19,000–21,999	20	10
≥22,000	21	11

12.4.2.6 Smoke-protected assembly seating conforming with the requirements of 12.4.2 shall be permitted to have a common path of travel of 50 ft (15 m) from any seat to a point where a person has a choice of two directions of egress travel.

12.4.2.7 Aisle Termination. Where smoke-protected assembly seating conforms to the requirements of 12.4.2, the dead ends in aisle stairs shall not exceed a distance of 21 rows.

Exception: A longer dead-end aisle shall be permitted for smoke-protected assembly seating where seats served by the dead-end aisle are not more than 40 seats from another aisle, measured along a row of seats having an aisle accessway with a clear width of not less than 12 in. (30.5 cm) plus 0.3 in. (0.8 cm) for each additional seat above seven in the row.

12.4.2.8 Where smoke-protected assembly seating conforms to the requirements of 12.4.2.1, the travel distance from each seat to the nearest entrance to an egress vomitory portal or egress concourse shall not exceed 400 ft (122 m). The travel distance from the entrance to the vomitory portal or from the egress concourse to an approved egress stair, ramp, or walk at the building exterior shall not exceed 200 ft (60 m).

Exception: In outdoor assembly seating facilities of Type I or Type II construction, where all portions of the means of egress are essentially open to the outside, the travel distance shall not be limited.

12.4.3 Windowless or Underground Buildings.

12.4.3.1 Windowless or underground buildings shall comply with 12.4.3 and Section 11.7.

12.4.3.2 Underground buildings or portions of buildings having a floor level more than 30 ft (9.1 m) below the level of exit discharge shall comply with the requirements of 12.4.3.3 through 12.4.3.5.

Exception No. 1: This requirement shall not apply to areas within buildings used only for service to the building, such as boiler/heater rooms, cable vaults, and dead storage.

Exception No. 2: This requirement shall not apply to auditoriums without intervening occupiable levels complying with the requirements of this chapter.

12.4.3.3 Each level more than 30 ft (9.1 m) below the level of exit discharge shall be divided into not less than two smoke

compartments by a smoke barrier complying with Section 8.3 and shall have a 1-hour fire resistance rating.

12.4.3.3.1 Each smoke compartment shall have access to not less than one exit without passing through the other required compartment. Any doors connecting required compartments shall be tight-fitting, minimum 1-hour rated fire doors designed and installed to minimize smoke leakage and to close and latch automatically upon detection of smoke.

12.4.3.3.2 Each smoke compartment shall be provided with a mechanical means of moving people vertically, such as an elevator or escalator.

12.4.3.3.3 Each smoke compartment shall have an independent air supply and exhaust system capable of smoke control or smoke exhaust functions that provide a smoke exhaust rate of not less than six air changes per hour.

12.4.3.3.4 Each smoke compartment shall be provided with an automatic smoke detection system throughout. The system shall be designed so that the activation of any two detectors causes the smoke control system to operate and the building voice alarm to sound.

12.4.3.4 Any required smoke control or exhaust system shall be provided with a standby power system complying with Article 701 of NFPA 70, *National Electrical Code*.

12.4.3.5 The building shall be provided with an approved, supervised voice alarm system in accordance with Section 9.6. The voice alarm system shall comply with 9.6.3.10. A pre-recorded evacuation message shall be provided.

12.4.4 High-Rise Buildings. High-rise assembly occupancy buildings and high-rise mixed occupancy buildings that house assembly occupancies in the high-rise portions of the building shall comply with Section 11.8.

12.4.5 Stages and Platforms. (See 3.3.166 and 3.3.134.)

12.4.5.1 Materials and Design. Materials used in the construction of platforms and stages shall conform to the applicable requirements of the local building code.

12.4.5.2 Platform Construction. Temporary platforms shall be permitted to be constructed of any materials. The space between the floor and the platform above shall not be used for any purpose other than the electrical wiring to platform equipment.

Permanent platforms shall be of the materials required for the type of building construction in which the permanent platform is located, except that the finish floor shall be permitted to be of wood in all types of construction. Where the space beneath the platform is used for storage or any purpose other than equipment wiring or plumbing, the floor construction shall not be less than 1-hour fire resistive.

12.4.5.3 Stage Construction.

12.4.5.3.1 Regular stages shall be of the materials required for the type of building construction in which they are located. In all cases, the finish floor shall be permitted to be of wood.

12.4.5.3.2 Legitimate stages shall be constructed of materials required for Type I buildings, except that the area extending from the proscenium opening to the back wall of the stage, and for a distance of 6 ft (183 cm) beyond the proscenium opening on each side, shall be permitted to be constructed of steel or heavy timber covered with a wood floor not less than 1½ in. (3.8 cm) in actual thickness.

12.4.5.3.3 Openings through stage floors (traps) shall be equipped with tight-fitting trap doors of wood having an actual thickness of not less than $1\frac{1}{2}$ in. (3.8 cm) with approved safety locks.

12.4.5.4 Accessory Rooms. Workshops, storerooms, permanent dressing rooms, and other accessory spaces contiguous to stages shall be separated from each other and other building areas by 1-hour fire resistance-rated construction and protected openings.

Exception: A separation shall not be required for stages having a floor area not exceeding 1000 ft² (93 m²).

12.4.5.5 Ventilators. Regular stages in excess of 1000 ft² (93 m²) and legitimate stages shall be provided with emergency ventilation to provide a means of removing smoke and combustion gases directly to the outside in the event of a fire. Ventilation shall be by one, or a combination of, the following methods.

(a) *Smoke Control.* A means complying with Section 9.3 shall be provided to maintain the smoke level at not less than 6 ft (183 cm) above the highest level of assembly seating or above the top of the proscenium opening where a proscenium wall and opening protection are provided. The system shall be activated independently by each of the following:

- (1) Activation of the sprinkler system in the stage area
- (2) Activation of smoke detectors over the stage area
- (3) Activation by manually operated switch at an approved location

The emergency ventilation system shall be supplied by both normal and standby power. The fan(s) power wiring and ducts shall be located and properly protected to ensure not less than 20 minutes of operation in the event of activation.

(b) *Roof Vents.* Two or more vents shall be located near the center of and above the highest part of the stage area. They shall be raised above the roof and shall provide a net-free vent area equal to 5 percent of the stage area. Vents shall be constructed to open automatically by approved heat-activated devices. Supplemental means shall be provided for manual operation and periodic testing of the ventilator from the stage floor. Vents shall be labeled.

(c) *Other Means.* Approved, alternate means of removing smoke and combustion gases shall be permitted.

12.4.5.6 Proscenium Walls. Legitimate stages shall be completely separated from the seating area by a proscenium wall of not less than 2-hour fire-resistive, noncombustible construction. The proscenium wall shall extend not less than 4 ft (122 cm) above the roof of the auditorium in combustible construction.

All openings in the proscenium wall of a legitimate stage shall be protected by a fire assembly having a $1\frac{1}{2}$ -hour fire protection rating.

Exception No. 1: The main proscenium opening used for viewing performances shall be provided with an automatic-closing fire-resistive curtain as described in 12.4.5.7.

Exception No. 2: Proscenium walls shall not be required in smoke-protected assembly seating facilities constructed and operated in accordance with 12.4.2.

12.4.5.7 Proscenium Opening Protection. Where required by 12.4.5.6, the proscenium opening shall be protected by a fire curtain or an approved water curtain complying with NFPA 13, *Standard for the Installation of Sprinkler Systems*. The fire cur-

tain or water curtain shall be designed to activate upon automatic detection of a fire and upon manual activation.

The fire curtain shall resist the passage of flame and smoke between the stage area and the audience area for 20 minutes.

A fire curtain shall be an opening protective assembly labeled by an approved agency or shall be constructed as follows.

(a) *Asbestos Fabrics.* Where not prohibited by applicable federal, state, or local law, a curtain shall be permitted to be made of one or more thicknesses of not less than a $2\frac{3}{4}$ -lb/yd² (1.5-kg/m²) AAA grade wire-inserted asbestos fabric or of another wire-inserted asbestos fabric of fire resistance exceeding $2\frac{3}{4}$ -lb/yd² (1.5-kg/m²) AAA grade wire-inserted fabric. Nonasbestos portions of these fabrics, if any, shall be flame-resistant treated so as not to support combustion.

(b) *Other Fabrics.* Curtains not meeting the criteria of 12.4.5.7(a) shall be made of one or more thicknesses of a noncombustible fabric or a fabric with a noncombustible base material. The fabric shall be permitted to be given a coating, provided that the modified fabric meets the criteria detailed in 12.4.5.7. Curtain fabrics shall have a weight of not less than $2\frac{3}{8}$ lb/yd² (1.3 kg/m²).

(c) *Tensile Strength Requirements.* Curtain fabric shall have tensile strength requirements of not less than 400 lbf/in. (540 N/m) in both the warp and fill directions.

(d) *Wire-Insertion Reinforcement Requirements.* The fabric shall be reinforced with noncorrosive wire intertwined with the base fiber at a rate of not less than one wire per yarn. Wire shall not be required, and fabric weight shall be permitted to be less than $2\frac{3}{8}$ lb/yd² (1.3 kg/m²) if it can be substantiated by approved tests that it is equivalent in strength and durability.

(e) *Fire Test.* A sample curtain with not less than two vertical seams shall be subjected to the standard fire test specified in NFPA 251, *Standard Methods of Tests of Fire Endurance of Building Construction and Materials*, as applicable to nonbearing walls and partitions for a period of 30 minutes. The curtain shall overlap the furnace edges by a length that is appropriate to seal the top and sides. It shall have a bottom pocket containing not less than 4 lb/linear ft (5 kg/m) of batten. The unexposed surface of the curtain shall not glow, and neither flame nor smoke shall penetrate the curtain during the test period. Unexposed surface temperature and hose stream test requirements shall not be applicable to this proscenium fire safety curtain test.

(f) *Smoke Test.* Curtain fabrics shall have a smoke density not to exceed 25 where tested in accordance with NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials*. The curtain fabric shall be tested in the condition in which it is to be used.

(g) *Curtain Operation.* The complete installation of every proscenium curtain shall be subjected to operating tests, and any theater in which a proscenium curtain is placed shall not be open to public performance until after the proscenium curtain has been accepted and approved by the authority having jurisdiction. The curtain shall be automatic-closing without the use of applied power. The curtain also shall be capable of manual operation.

(h) *Curtain Position.* All proscenium curtains shall be in the closed position, except during performances, rehearsals, or similar activities.

12.4.5.8 Gridiron, Fly Galleries, and Pinrails. Structural framing designed only for the attachment of portable or fixed theater equipment, gridirons, galleries, and catwalks shall be

constructed of materials consistent with the building type of construction, and a fire resistance rating shall not be required.

Exception: Combustible materials shall be permitted for use as the floors of galleries and catwalks of all types of construction.

12.4.5.9 Catwalks. The clear width of lighting and access catwalks and the means of egress from galleries and gridirons shall be not less than 22 in. (56 cm).

12.4.5.10 Fire Protection. Every stage shall be protected by an approved, supervised automatic sprinkler system in compliance with Section 9.7. The protection shall be provided throughout the stage and in storerooms, workshops, permanent dressing rooms, and other accessory spaces contiguous to such stages.

Exception No. 1: Sprinklers shall not be required for stages 1000 ft² (93 m²) or less in area and 50 ft (15 m) or less in height where curtains, scenery, or other combustible hangings are not retractable vertically. Combustible hangings shall be limited to a single main curtain, borders, legs, and a single backdrop.

Exception No. 2: Sprinklers shall not be required under stage areas less than 4 ft (1.2 m) in clear height used exclusively for chair or table storage and lined on the inside with ⁵/₈-in. (1.6-cm) Type X gypsum wallboard or the approved equivalent.

12.4.5.11 Flame-Retardant Requirements. Combustible scenery of cloth, film, vegetation (dry), and similar materials shall meet the requirements of NFPA 701, *Standard Methods of Fire Tests for Flame Propagation of Textiles and Films*. Foamed plastics (see definition of cellular or foamed plastic in 3.3.28) shall be permitted to be used only by specific approval of the authority having jurisdiction. Scenery and stage properties not separated from the audience by proscenium opening protection shall be of either noncombustible or limited-combustible materials.

In theaters, motion picture theaters, and television stage settings, with or without horizontal projections, and in simulated caves and caverns of foamed plastic, any single fuel package shall have a heat release rate not to exceed 100 kW where tested in accordance with UL 1975, *Standard for Fire Tests for Foamed Plastics Used for Decorative Purposes*.

12.4.5.12* Standpipes. Regular stages over 1000 ft² (93 m²) in area and all legitimate stages shall be equipped with 1¹/₂-in. (38-mm) hose lines for first aid fire fighting at each side of the stage. Hose connections shall be in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*, unless Class II or Class III standpipes in accordance with NFPA 14, *Standard for the Installation of Standpipe, Private Hydrants, and Hose Systems*, are used.

12.4.6 Projection Booths.

12.4.6.1 Film or video projectors or spotlights using light sources that produce particulate matter or toxic gases, or light sources that produce hazardous radiation without protective shielding, shall be located within a projection room complying with 12.3.2.1.3. Where cellulose nitrate film is used, the projection room shall comply with NFPA 40, *Standard for the Storage and Handling of Cellulose Nitrate Motion Picture Film*.

12.4.6.2 Projection Rooms for Safety Film. Projection rooms for safety film shall comply with 12.4.6.2.1 through 12.4.6.2.6.

12.4.6.2.1 Every projection room for safety film shall be of permanent construction consistent with the construction requirements for the type of building in which the projection

room is located. Openings shall not be required to be protected. The room shall have a floor area of not less than 80 ft² (7.4 m²) for a single machine and not less than 40 ft² (3.7 m²) for each additional machine. Each motion picture projector, floodlight, spotlight, or similar piece of equipment shall have a clear working space of not less than 30 in. (76 cm) on each side and at its rear, but only one such space shall be required between adjacent projectors.

The projection room and the rooms appurtenant to it shall have a ceiling height of not less than 7 ft 6 in. (2.3 m).

12.4.6.2.2 Each projection room for safety film shall have not less than one out-swinging, self-closing door not less than 30 in. (76 cm) wide and 6 ft 8 in. (2 m) high.

12.4.6.2.3 The aggregate of ports and openings for projection equipment shall not exceed 25 percent of the area of the wall between the projection room and the auditorium. All openings shall be provided with glass or other approved material so as to completely close the opening.

12.4.6.2.4 Projection room ventilation shall be not less than the following.

(a) *Supply Air.* Each projection room shall be provided with adequate air supply inlets arranged to provide well-distributed air throughout the room. Air inlet ducts shall provide an amount of air equivalent to the amount of air being exhausted by projection equipment. Air shall be permitted to be taken from the outside; from adjacent spaces within the building, provided that the volume and infiltration rate is sufficient; or from the building air conditioning system, provided that it is arranged to supply sufficient air whether or not other systems are in operation.

(b) *Exhaust Air.* Projection booths shall be permitted to be exhausted through the lamp exhaust system. The lamp exhaust system shall be positively interconnected with the lamp so that the lamp cannot operate unless there is sufficient airflow required for the lamp. Exhaust air ducts shall terminate at the exterior of the building in such a location that the exhaust air cannot be readily recirculated into any air supply system. The projection room ventilation system shall be permitted also to serve appurtenant rooms, such as the generator room and the rewind room.

12.4.6.2.5 Each projection machine shall be provided with an exhaust duct that draws air from each lamp and exhausts it directly to the outside of the building. The lamp exhaust shall be permitted to exhaust air from the projection room to provide room air circulation. Such ducts shall be of rigid materials, except for a flexible connector approved for the purpose. The projection lamp and projection room exhaust systems shall be permitted to be combined but shall not be interconnected with any other exhaust system or return-air system within the buildings. Specifications for electric arc and xenon projection equipment follow.

(a) *Electric Arc Projection Equipment.* The exhaust capacity shall be 200 ft³/min (0.09 m³/s) for each lamp connected to the lamp exhaust system, or as recommended by the equipment manufacturer. Auxiliary air shall be permitted to be introduced into the system through a screened opening to stabilize the arc.

(b) *Xenon Projection Equipment.* The lamp exhaust system shall exhaust not less than 300 ft³/min (0.14 m³/s) per lamp, or not less than that exhaust volume required or recommended by the equipment manufacturer, whichever is greater.

12.4.6.2.6 Miscellaneous equipment and storage shall be protected as follows:

- (1) Each projection room shall be provided with rewind and film storage facilities.
- (2) Flammable liquids containers shall be permitted in projection rooms, provided that the following criteria are met:
 - a. There are not more than four containers per projection room
 - b. No container has capacity exceeding 16 oz (0.5 L)
 - c. Containers are of a nonbreakable type
- (3) Appurtenant electrical equipment, such as rheostats, transformers, and generators, shall be permitted to be located within the booth or in a separate room of equivalent construction.

12.4.6.3 Projection Room Posting. A conspicuous sign with 1-in. (2.5-cm) block letters shall be posted on the outside of each projection room door and within the projection room proper, unless the projection room is constructed in accordance with NFPA 40, *Standard for the Storage and Handling of Cellulose Nitrate Motion Picture Film*. The sign shall state the following:

SAFETY FILM ONLY PERMITTED IN THIS ROOM

12.4.7* Special Amusement Buildings.

12.4.7.1 Special amusement buildings, regardless of occupant load, shall meet the requirements for assembly occupancies in addition to the requirements of 12.4.7, unless the multilevel play structures are not more than 10 ft (3 m) in height and have aggregate horizontal projections not exceeding 160 ft² (14.9 m²).

12.4.7.2* Every special amusement building, other than buildings or structures not exceeding 10 ft (3 m) in height and not exceeding 160 ft² (14.9 m²) in horizontal projection, shall be protected throughout by an approved, supervised automatic sprinkler system installed and maintained in accordance with Section 9.7. Where the special amusement building is movable or portable, the sprinkler water supply shall be permitted to be provided by an approved, temporary means.

12.4.7.3 Where the nature of the special amusement building is such that it operates in reduced lighting levels, the building shall be protected throughout by an approved automatic smoke detection system in accordance with Section 9.6. Actuation of any smoke detection system device shall sound an alarm at a constantly attended location on the premises. Actuation of the automatic sprinkler system, or any other suppression system, or actuation of a smoke detection system having an approved verification or cross-zoning operation capability shall provide the following:

- (1) Cause illumination in the means of egress to increase to that required by Section 7.8
- (2) Stop any conflicting or confusing sounds and visuals

12.4.7.4 Exit Marking.

12.4.7.4.1 Exit marking shall be in accordance with Section 7.10.

12.4.7.4.2 Floor proximity exit signs shall be provided in accordance with 7.10.1.5.

12.4.7.4.3* In special amusement buildings where mazes, mirrors, or other designs are used to confound the egress

path, approved directional exit marking that becomes apparent in an emergency shall be provided.

12.4.7.5 Interior Finish. Interior finish shall be Class A throughout in accordance with Section 10.2.

12.4.8 Grandstands.

12.4.8.1 General. Grandstands shall comply with the provisions of this chapter as modified by 12.4.8.

12.4.8.2 Seating.

12.4.8.2.1 Where grandstand seating without backs is used indoors, rows of seats shall be spaced not less than 22 in. (55.9 cm) back-to-back.

12.4.8.2.2 The depth of footboards and seat boards in grandstands shall be not less than 9 in. (22.9 cm). Where the same level is not used for both seat foundations and footrests, footrests independent of seats shall be provided.

12.4.8.2.3 Seats and footrests of grandstands shall be supported securely and fastened in such a manner that they cannot be displaced inadvertently.

12.4.8.2.4 Individual seats or chairs shall be permitted only if secured in rows in an approved manner, unless seats do not exceed 16 in number and are located on level floors and within railed-in enclosures, such as boxes.

12.4.8.3 Special Requirements — Wood Grandstands.

12.4.8.3.1 An outdoor wood grandstand shall be erected within not less than two-thirds of its height and, in no case, within not less than 10 ft (3 m) of a building.

Exception No. 1: The distance requirement shall not apply for buildings of not less than 1-hour fire resistance-rated construction with openings protected against the fire exposure hazard created by the grandstand.

Exception No. 2: The distance requirement shall not apply where a wall of not less than 1-hour fire resistance-rated construction separates such a grandstand from the building.

12.4.8.3.2 An outdoor wood grandstand unit shall not exceed 10,000 ft² (929 m²) in ground area or 200 ft (61 m) in length. Grandstand units of the maximum size shall be placed not less than 20 ft (6.1 m) apart or shall be separated by walls of 1-hour fire resistance rating. The number of such units erected in any one group shall not exceed three. Each group shall be separated from any other group by a wall of 2-hour fire resistance-rated construction extending 2 ft (0.6 m) above the seat platforms or by an open space of not less than 50 ft (15.2 m).

Exception: Where entirely constructed of labeled fire-retardant-treated wood that has passed the standard rain test, ASTM D 2898, Test Method for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing, or where constructed of members conforming to dimensions for heavy timber construction (Type IV (2HH)), the ground area or length shall be permitted to be doubled.

12.4.8.3.3 The highest level of seat platforms above the ground or the surface at the front of the grandstand for any wood grandstand shall not exceed 20 ft (6.1 m). For portable grandstands within tents or membrane structures, the highest level shall not exceed 12 ft (3.7 m).

Exception: Where entirely constructed of labeled fire-retardant-treated wood that has passed the standard rain test, ASTM D 2898, Test Method for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing, or where constructed of members conforming to dimen-

sions for heavy timber construction (Type IV (2HH)), the height shall be permitted to be doubled.

12.4.8.4 Special Requirements — Portable Grandstands.

12.4.8.4.1 Portable grandstands shall conform to the requirements of 12.4.8 for grandstands and the requirements of 12.4.8.4.2 and 12.4.8.4.3.

12.4.8.4.2 Portable grandstands shall be self-contained and shall have within them all necessary parts to withstand and restrain all forces that might be developed during human occupancy. They shall be designed and manufactured so that if any structural members essential to the strength and stability of the structure have been omitted during erection, the presence of unused connection fittings shall make the omissions self-evident. The construction shall be skillfully accomplished to produce the strength required by the design.

12.4.8.4.3 Portable grandstands shall be provided with base plates, sills, floor runners, or sleepers of such area that the permitted bearing capacity of the supporting material is not exceeded. Where portable grandstands rest directly on a base of such character that it is incapable of supporting the load without appreciable settlement, mud sills of suitable material, having sufficient area to prevent undue or dangerous settlement, shall be installed under base plates, runners, or sleepers. All bearing surfaces shall be in contact with each other.

12.4.8.5 Spaces Underneath Grandstands. Spaces underneath a grandstand shall be kept free of flammable or combustible materials, unless protected by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

Exception No. 1: This requirement shall not apply to accessory uses of 300 ft² (28 m²) or less in area where of noncombustible or fire-resistive construction, such as ticket booths, toilet facilities, or concession booths, in otherwise nonsprinklered facilities.

Exception No. 2: This requirement shall not apply to rooms enclosed in not less than 1-hour fire resistance-rated construction that are less than 1000 ft² (93 m²) in area in otherwise nonsprinklered facilities.

12.4.8.6 Guards and Railings.

12.4.8.6.1 Railings or guards not less than 42 in. (107 cm) above the aisle surface or footrest or not less than 36 in. (91 cm) vertically above the center of the seat or seat board surface, whichever is adjacent, shall be provided along those portions of the backs and ends of all grandstands where the seats are more than 4 ft (1.2 m) above the floor or ground.

Exception: This requirement shall not apply where an adjacent wall or fence affords equivalent safeguard.

12.4.8.6.2 Where the front footrest of any grandstand is more than 2 ft (0.6 m) above the floor, railings or guards not less than 33 in. (84 cm) above such footrests shall be provided.

Exception: In grandstands, or where the front row of seats includes backrests, the rails shall be not less than 26 in. (66 cm) high.

12.4.8.6.3 Cross aisles located within the seating area shall be provided with rails not less than 26 in. (66 cm) high along the front edge of the cross aisle.

Exception: Where the backs of the seats in front of the cross aisle project 24 in. (61 cm) or more above the surface of the cross aisle, the rail shall not be required.

12.4.8.6.4 Vertical openings between guardrails and footboards or seat boards shall be provided with intermediate con-

struction so that a 4-in. (10.2-cm) diameter sphere cannot pass through the opening.

12.4.8.6.5 An opening between the seat board and footboard located more than 30 in. (76 cm) above grade shall be provided with intermediate construction so that a 4-in. (10.2-cm) diameter sphere cannot pass through the opening.

12.4.9 Folding and Telescopic Seating.

12.4.9.1 General. Folding and telescopic seating shall comply with the provisions of this chapter as modified by 12.4.9.

12.4.9.2 Seating.

12.4.9.2.1 The horizontal distance of seats, measured back-to-back, shall be not less than 22 in. (55.9 cm) for seats without backs. There shall be a space of not less than 12 in. (30.5 cm) between the back of each seat and the front of each seat immediately behind it. If seats are of the chair type, the 12-in. (30.5-cm) dimension shall be measured to the front edge of the rear seat in its normal unoccupied position. All measurements shall be taken between plumb lines.

12.4.9.2.2 The depth of footboards (footrests) and seat boards in folding and telescopic seating shall be not less than 9 in. (22.9 cm). Where the same level is not used for both seat foundations and footrests, footrests independent of seats shall be provided.

12.4.9.2.3 Individual chair-type seats shall be permitted in folding and telescopic seating only if firmly secured in groups of not less than three.

12.4.9.3 Guards and Railings.

12.4.9.3.1 Railings or guards not less than 42 in. (107 cm) above the aisle surface or footrest or not less than 36 in. (91 cm) vertically above the center of the seat or seat board surface, whichever is adjacent, shall be provided along those portions of the backs and ends of all folding and telescopic seating where the seats are more than 4 ft (1.2 m) above the floor or ground.

Exception: This requirement shall not apply where an adjacent wall or fence affords equivalent safeguard.

12.4.9.3.2 Where the front footrest of folding or telescopic seating is more than 2 ft (0.6 m) above the floor, railings or guards not less than 33 in. (84 cm) above such footrests shall be provided.

Exception: Where the front row of seats includes backrests, the rails shall be not less than 26 in. (66 cm) high.

12.4.9.3.3 Cross aisles located within the seating area shall be provided with rails not less than 26 in. (66 cm) high along the front edge of the cross aisle.

Exception: Where the backs of the seats in front of the cross aisle project 24 in. (61 cm) or more above the surface of the cross aisle, the rail shall not be required.

12.4.9.3.4 Vertical openings between guardrails and footboards or seat boards shall be provided with intermediate construction so that a 4-in. (10.2-cm) diameter sphere cannot pass through the opening.

12.4.9.3.5 An opening between the seat board and footboard located more than 30 in. (76 cm) above grade shall be provided with intermediate construction so that a 4-in. (10.2-cm) diameter sphere cannot pass through the opening.

SECTION 12.5 BUILDING SERVICES

12.5.1 Utilities. Utilities shall comply with the provisions of Section 9.1.

12.5.2 Heating, Ventilating, and Air Conditioning Equipment. Heating, ventilating, and air conditioning equipment shall comply with the provisions of Section 9.2.

12.5.3 Elevators, Escalators, and Conveyors. Elevators, escalators, and conveyors shall comply with the provisions of Section 9.4.

12.5.4 Rubbish Chutes, Incinerators, and Laundry Chutes. Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 9.5.

SECTION 12.6 RESERVED

SECTION 12.7 OPERATING FEATURES

12.7.1 Special Provisions for Food Service Operations.

12.7.1.1 All devices in connection with the preparation of food shall be installed and operated to avoid hazard to the safety of occupants.

12.7.1.2 All devices in connection with the preparation of food shall be of an approved type and shall be installed in an approved manner.

12.7.1.3 Food preparation facilities shall be protected in accordance with 9.2.3 and shall not be required to have openings protected between food preparation areas and dining areas.

12.7.1.4 Portable Cooking Equipment. Portable cooking equipment that is not flue-connected shall be permitted only as follows:

- (1) Equipment fueled by small heat sources that can be readily extinguished by water, such as candles or alcohol-burning equipment, including solid alcohol, shall be permitted to be used, provided that precautions satisfactory to the authority having jurisdiction are taken to prevent ignition of any combustible materials.
- (2) Candles shall be permitted to be used on tables used for food service where securely supported on substantial noncombustible bases located to avoid danger of ignition of combustible materials and only where approved by the authority having jurisdiction.
- (3) Candle flames shall be protected.
- (4) "Flaming sword" or other equipment involving open flames and flamed dishes, such as cherries jubilee or crêpe suzette, shall be permitted to be used, provided that precautions subject to the approval of the authority having jurisdiction are taken.
- (5) *Listed and approved LP-Gas commercial food service appliances shall be permitted to be used where in accordance with NFPA 58, *Liquefied Petroleum Gas Code*.

12.7.2 Open Flame Devices and Pyrotechnics. No open flame devices or pyrotechnic device shall be used in any assembly occupancy.

Exception No. 1: Pyrotechnic special effect devices shall be permitted to be used on stages before proximate audiences for ceremonial or religious purposes, as part of a demonstration in exhibits, or as part of a performance, provided that precautions satisfactory to the authority having jurisdiction are taken to prevent ignition of any combustible material and use of the pyrotechnic device complies with NFPA 1126, Standard for the Use of Pyrotechnics before a Proximate Audience.

Exception No. 2: Flame effects before an audience shall be permitted in accordance with NFPA 160, Standard for Flame Effects Before an Audience.

Exception No. 3: Open flame devices shall be permitted to be used in the following situations, provided that precautions satisfactory to the authority having jurisdiction are taken to prevent ignition of any combustible material or injury to occupants:

(a)* *Where necessary for ceremonial or religious purposes*

(b) *On stages and platforms as a necessary part of a performance*

(c) *Where candles on tables are securely supported on substantial noncombustible bases and candle flame is protected.*

Exception No. 4: This requirement shall not apply to heat-producing equipment complying with 9.2.2.

Exception No. 5: This requirement shall not apply to food service operations in accordance with 12.7.1.

Exception No. 6: Gas lights shall be permitted to be used, provided that precautions subject to the approval of the authority having jurisdiction are taken to prevent ignition of any combustible materials.

12.7.3 Furnishings, Decorations, and Scenery.

12.7.3.1 Fabrics and films used for decorative purposes, all draperies and curtains, and similar furnishings shall be in accordance with the provisions of 10.3.1.

12.7.3.2 The authority having jurisdiction shall impose controls on the quantity and arrangement of combustible contents in assembly occupancies to provide an adequate level of safety to life from fire.

12.7.3.3* Exposed foamed plastic materials and unprotected materials containing foamed plastic used for decorative purposes or stage scenery shall have a heat release rate not exceeding 100 kW where tested in accordance with UL 1975, *Standard for Fire Tests for Foamed Plastics Used for Decorative Purposes*.

Exception: This requirement shall not apply to individual foamed plastic items or items containing foamed plastic where the foamed plastic does not exceed 1 lb (0.45 kg) in weight.

12.7.4 Special Provisions for Exposition Facilities.

12.7.4.1 No display or exhibit shall be installed or operated to interfere in any way with access to any required exit or with the visibility of any required exit or required exit sign; nor shall any display block access to fire-fighting equipment.

12.7.4.2 A storage room having an enclosure consisting of a smoke barrier having a fire resistance rating of 1 hour and protected by an automatic extinguishing system shall be provided for combustible materials not on display, including combustible packing crates used to ship exhibitors' supplies and products.

12.7.4.3 Exhibits.

12.7.4.3.1 Exhibits shall comply with 12.7.4.3.2 through 12.7.4.3.11.

12.7.4.3.2 The travel distance within the exhibit booth or exhibit enclosure to an exit access aisle shall not exceed 50 ft (15 m).

12.7.4.3.3 The upper deck of multilevel exhibits exceeding 300 ft² (27.9 m²) shall have not less than two remote means of egress.

12.7.4.3.4 Exhibit booths shall be constructed of the following:

- (1) Noncombustible or limited-combustible materials
- (2) Wood exceeding $\frac{1}{4}$ in. (0.6 cm) nominal thickness or wood not exceeding $\frac{1}{4}$ in. (0.6 cm) nominal thickness that is pressure-treated, fire-retardant wood meeting the requirements of NFPA 703, *Standard for Fire Retardant Impregnated Wood and Fire Retardant Coatings for Building Materials*
- (3) *Flame-retardant materials complying with NFPA 701, *Standard Methods of Fire Tests for Flame Propagation of Textiles and Films*
- (4) Textile wall coverings, such as carpeting and similar products used as wall or ceiling finishes, complying with the provisions of 10.2.2 and 10.2.4
- (5) Plastics limited to those that comply with 12.3.3 and Section 10.2
- (6) Foamed plastics and materials containing foamed plastics having a heat release rate for any single fuel package that does not exceed 100 kW where tested in accordance with UL 1975, *Standard for Fire Tests for Foamed Plastics Used for Decorative Purposes*
- (7) Cardboard, honeycombed paper, and other combustible materials having a heat release rate for any single fuel package that does not exceed 150 kW where tested in accordance with UL 1975, *Standard for Fire Tests for Foamed Plastics Used for Decorative Purposes*

12.7.4.3.5 Curtains, drapes, and decorations shall comply with the applicable portions of 10.3.1.

12.7.4.3.6 Acoustical and decorative material including, but not limited to, cotton, hay, paper, straw, moss, split bamboo, and wood chips shall be flame-retardant treated to the satisfaction of the authority having jurisdiction. Materials that cannot be treated for flame retardancy shall not be used. Foamed plastics and materials containing foamed plastics used as decorative objects such as, but not limited to, mannequins, murals, and signs shall have a heat release rate for any single fuel package that does not exceed 150 kW where tested in accordance with UL 1975, *Standard for Fire Tests for Foamed Plastics Used for Decorative Purposes*.

Exception: Where the aggregate area of such materials is less than 10 percent of the individual floor or wall area, such materials shall be permitted to be used subject to the approval of the authority having jurisdiction.

12.7.4.3.7 The following shall be protected by automatic extinguishing systems:

- (1) Single-level exhibit booths exceeding 300 ft² (27.9 m²) and covered with a ceiling
- (2) Each level of multilevel exhibit booths, including the uppermost level where the uppermost level is covered with a ceiling

A single exhibit or group of exhibits with ceilings that do not require sprinklers shall be separated by a distance of not less than 10 ft (3 m) where the aggregate ceiling exceeds 300 ft² (27.9 m²).

The water supply and piping for the sprinkler system shall be permitted to be of an approved, temporary means that is provided by a domestic water supply, a standpipe system, or a sprinkler system.

Exception No. 1: Ceilings that are constructed of open grate design or listed dropout ceilings in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*, shall not be considered ceilings within the context of 12.7.4.3.7.

Exception No. 2: Vehicles, boats, and similar exhibited products having over 100 ft² (9.3 m²) of roofed area shall be provided with smoke detectors acceptable to the authority having jurisdiction.

*Exception No. 3:** This requirement shall not apply where fire protection of multilevel exhibit booths is consistent with the criteria developed through a life safety evaluation of the exhibition hall in accordance with 12.4.1, subject to approval of the authority having jurisdiction.

12.7.4.3.8 Open flame devices within exhibit booths shall comply with 12.7.2.

12.7.4.3.9 Cooking and food-warming devices in exhibit booths shall comply with 12.7.1 and the following:

- (1) Gas-fired devices shall comply with the following:
 - a. Natural gas-fired devices shall be in accordance with 9.1.1.

Exception: The requirement of 12.7.4.3.9(1)a shall not apply to compressed natural gas where permitted by the authority having jurisdiction.

- b. The use of LP-Gas cylinders shall be prohibited.

Exception: Nonrefillable LP-Gas cylinders shall be permitted to be used where permitted by the authority having jurisdiction.

- (2) The devices shall be isolated from the public by not less than 4 ft (1.2 m) or by a barrier between the devices and the public.
- (3) Multi-well cooking equipment using combustible oils or solids shall comply with 9.2.3.
- (4) Single-well cooking equipment using combustible oils or solids shall meet the following criteria:
 - a. They shall have lids available for immediate use.
 - b. They shall be limited to 288 in.² (0.19 m²) of cooking surface.
 - c. They shall be placed on noncombustible surface materials.
 - d. They shall be separated from each other by a horizontal distance of not less than 2 ft (0.6 m).

Exception: The requirement of 12.7.4.3.9(4)d shall not apply to multiple single-well cooking equipment where the aggregate cooking surface area does not exceed 288 in.² (0.19 m²).

- e. They shall be kept at a horizontal distance of not less than 2 ft (0.6 m) from any combustible material.
- (5) A 20-B:C fire extinguisher shall be provided within the booth for each device, or an approved automatic extinguishing system shall be provided. (See 9.7.4.1.)

12.7.4.3.10 Combustible materials within exhibit booths shall be limited to a one-day supply. Storage of combustible materials behind the booth shall be prohibited. (See 12.7.3.2 and 12.7.4.2.)

12.7.4.3.11 Plans for the exposition, in an acceptable form, shall be submitted to the authority having jurisdiction for approval prior to setting up any exhibit. The plan shall show all details of the proposed exposition. No exposition shall occupy any exposition facility without approved plans.

12.7.4.4 Vehicles. Vehicles on display within an exposition facility shall comply with 12.7.4.4.1 through 12.7.4.4.5.

12.7.4.4.1 All fuel tank openings shall be locked and sealed in an approved manner to prevent the escape of vapors. Fuel tanks shall not contain in excess of one-half their capacity or contain in excess of 10 gal (37.9 L) of fuel, whichever is less.

12.7.4.4.2 At least one battery cable shall be removed from the batteries used to start the vehicle engine. The disconnected battery cable shall then be taped.

12.7.4.4.3 Batteries used to power auxiliary equipment shall be permitted to be kept in service.

12.7.4.4.4 Fueling or defueling of vehicles shall be prohibited.

12.7.4.4.5 Vehicles shall not be moved during exhibit hours.

12.7.4.5 Compressed flammable gases; flammable or combustible liquids; hazardous chemicals or materials; and Class II or greater lasers, blasting agents, and explosives shall be prohibited within exhibit halls.

Exception: The authority having jurisdiction shall be permitted to allow the limited use of any items specified in 12.7.4.5 under special circumstances.

12.7.4.6 Alternatives. (See Section 1.5.)

12.7.5* Crowd Managers. In assembly occupancies having occupant loads exceeding 1000, there shall be trained crowd managers or crowd manager supervisors at a ratio of 1 crowd manager/supervisor for every 250 occupants. The crowd manager shall receive approved training in crowd management techniques.

Exception No. 1: This requirement shall not apply to assembly occupancies used exclusively for religious worship with an occupant load not exceeding 2000.

Exception No. 2: Where, in the opinion of the authority having jurisdiction, the existence of an approved, supervised automatic sprinkler system and the nature of the event warrant, the ratio of trained crowd managers to occupants shall be permitted to be reduced.

12.7.6* Drills.

12.7.6.1 The employees or attendants of assembly occupancies shall be trained and drilled in the duties they are to perform in case of fire, panic, or other emergency to effect orderly exiting.

12.7.6.2 Employees or attendants of assembly occupancies shall be instructed in the proper use of portable fire extinguishers and other manual fire suppression equipment where provided.

12.7.6.3* In theaters, motion picture theaters, auditoriums, and other similar assembly occupancies with occupant loads exceeding 300 where there are noncontinuous programs, an audible announcement shall be made, or a projected image shall be shown, prior to the start of each program to notify occupants of the location of the exits to be used in case of a fire or other emergency.

Exception: This requirement shall not apply to assembly occupancies in schools where used for nonpublic events.

12.7.7 Smoking.

12.7.7.1 Smoking in assembly occupancies shall be regulated by the authority having jurisdiction.

12.7.7.2 In rooms or areas where smoking is prohibited, plainly visible signs shall be posted that read as follows:

NO SMOKING

12.7.7.3 No person shall smoke in prohibited areas that are so posted.

Exception: The authority having jurisdiction shall permit smoking on a stage only where it is a necessary and rehearsed part of a performance and only where the smoker is a regular performing member of the cast.

12.7.7.4 Where smoking is permitted, suitable ashtrays or receptacles shall be provided in convenient locations.

12.7.8 Seating.

12.7.8.1 Seats in assembly occupancies accommodating more than 200 persons shall be securely fastened to the floor, except where fastened together in groups of not less than three and not exceeding seven and as permitted by 12.7.8.2. All seats in balconies and galleries shall be securely fastened to the floor, except in places of religious worship.

12.7.8.2 Seats not secured to the floor shall be permitted in restaurants, night clubs, and other occupancies where fastening seats to the floor might be impracticable. Such unsecured seats shall be permitted, provided that, in the area used for seating, excluding such areas as dance floors and stages, there is not more than one seat for each 15 ft² (1.4 m²) of net floor area, and adequate aisles to reach exits are maintained at all times. Seating diagrams shall be submitted for approval by the authority having jurisdiction to permit an increase in occupant load per 7.3.1.3.

12.7.8.3 Every room constituting an assembly occupancy and not having fixed seats shall have the occupant load of the room posted in a conspicuous place near the main exit from the room. Approved signs shall be maintained in a legible manner by the owner or authorized agent. Signs shall be durable and shall indicate the number of occupants permitted for each room use.

12.7.9 Maintenance of Outdoor Grandstands. The owner shall provide for not less than annual inspection and required maintenance of each outdoor grandstand to ensure safe conditions. At least biennially, the inspection shall be performed by a professional engineer, registered architect, or individual certified by the manufacturer. Where required by the authority having jurisdiction, the owner shall provide certification that such inspection has been performed.

12.7.10 Maintenance and Operation of Folding and Telescopic Seating.

12.7.10.1 Instructions in both maintenance and operation shall be transmitted to the owner by the manufacturer of the seating or his or her representative.

12.7.10.2 Maintenance and operation of folding and telescopic seating shall be the responsibility of the owner or his or her duly authorized representative and shall include the following:

- (1) During operation of the folding and telescopic seats, the opening and closing shall be supervised by responsible personnel who shall ensure that the operation is in accordance with the manufacturer's instructions.
- (2) Only attachments specifically approved by the manufacturer for the specific installation shall be attached to the seating.
- (3) An annual inspection and required maintenance of each grandstand shall be performed to ensure safe conditions. At least biennially, the inspection shall be performed by a professional engineer, registered architect, or individual certified by the manufacturer.

12.7.11 Clothing. Clothing and personal effects shall not be stored in corridors.

Exception No. 1: This requirement shall not apply to corridors protected by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

Exception No. 2: This requirement shall not apply to corridor areas protected by a smoke detection system in accordance with Section 9.6.

Exception No. 3: This requirement shall not apply to storage in metal lockers, provided that the required egress width is maintained.

Chapter 13 EXISTING ASSEMBLY OCCUPANCIES

SECTION 13.1 GENERAL REQUIREMENTS

13.1.1 Application.

13.1.1.1 The requirements of this chapter apply to existing buildings or portions thereof currently occupied as assembly occupancies. (See 3.3.15 for definition of assembly occupancy; see also 12.1.1.)

Exception: An existing building housing an assembly occupancy established prior to the effective date of this Code shall be permitted to be approved for continued use if it conforms to or is made to conform to the provisions of this Code to the extent that, in the opinion of the authority having jurisdiction, reasonable life safety against the hazards of fire, explosion, and panic is provided and maintained.

13.1.1.2 Additions to existing buildings shall conform to the requirements for new construction. Existing portions of the structure shall not be required to be modified, provided that the new construction has not diminished the fire safety features of the facility.

Exception: Existing portions of buildings shall be upgraded if the addition results in an increase in the required minimum number of separate means of egress in accordance with 7.4.1.2.

13.1.1.3 An assembly occupancy in which an occupant load increase results in an increase in the required minimum number of separate means of egress, in accordance with 7.4.1.2, shall meet the requirements for new construction.

13.1.2 Mixed Occupancies. (See also 6.1.14.)

13.1.2.1* Any assembly occupancy and its access to exits in buildings of other occupancy, such as ballrooms in hotels, restaurants in stores, rooftop assembly occupancies, or assembly rooms in schools, shall be located, separated, or protected to avoid any undue danger to the occupants of the assembly occupancy from a fire originating in the other occupancy or smoke therefrom.

13.1.2.2 Occupancy of any room or space for assembly purposes by fewer than 50 persons in a building of other occupancy and incidental to such other occupancy shall be classified as part of the other occupancy and shall be subject to the provisions applicable thereto.

13.1.2.3 Assembly occupancies in buildings of other occupancy shall be permitted to use exits common to the assembly occupancy and the other occupancy, provided that the assembly area and the other occupancy considered separately each have exits sufficient to meet the requirements of this Code.

13.1.2.4* Exits shall be sufficient for simultaneous occupancy of both the assembly occupancy and other parts of the building, except where the authority having jurisdiction determines that the conditions are such that simultaneous occupancy will not occur.

13.1.2.5 Assembly and Mercantile Occupancies in Covered Mall Buildings. The provisions of Chapter 13 shall apply to the assembly occupancy tenant space. The provisions of 37.4.4 shall be permitted to be used outside the assembly occupancy tenant space.

13.1.3* Special Definitions.

Aisle Accessway. See 3.3.6.

Exhibit. See 3.3.57.

Exhibitor. See 3.3.58.

Exposition. See 3.3.64.

Exposition Facility. See 3.3.65.

Festival Seating. See 3.3.68.

Flow Time. See 3.3.83.

Fly Gallery. See 3.3.84.

Gridiron. See 3.3.90.

Legitimate Stage. See 3.3.114.

Life Safety Evaluation. See 3.3.116.

Multilevel Play Structure. See 3.3.128.

Pinrail. See 3.3.147.

Platform. See 3.3.149.

Proscenium Wall. See 3.3.156.

Regular Stage. See 3.3.161.

Smoke-Protected Assembly Seating. See 3.3.187.

Special Amusement Building. See 3.3.188.

Stage. See 3.3.191.

Temporary Platform. See 3.3.198.

13.1.4* Classification of Occupancy. (See 6.1.2.)

13.1.5 Classification of Hazard of Contents. Contents of assembly occupancies shall be classified in accordance with the provisions of Section 6.2.

13.1.6 Minimum Construction Requirements. The location of an assembly occupancy shall be limited as shown in Table 13.1.6. (See 8.2.1.)

Exception No. 1: This requirement shall not apply to outdoor grandstands of Type I or Type II construction.

Exception No. 2: This requirement shall not apply to outdoor grandstands of Type III, Type IV, or Type V construction and in accordance with 13.4.8.

Exception No. 3: This requirement shall not apply to grandstands of noncombustible construction supported by the floor in a building meeting the construction requirements of Table 13.1.6.

Exception No. 4: This requirement shall not apply to assembly occupancies within covered mall buildings in accordance with 37.4.4.

13.1.7 Occupant Load.

13.1.7.1* The occupant load, in number of persons for whom means of egress and other provisions are required, shall be determined on the basis of the occupant load factors of Table 7.3.1.2 that are characteristic of the use of the space or shall be determined as the maximum probable population of the space under consideration, whichever is greater. In areas not in excess of 10,000 ft² (930 m²), the occupant load shall not exceed one person in 5 ft² (0.46 m²); in areas in excess of 10,000 ft² (930 m²), the occupant load shall not exceed one person in 7 ft² (0.65 m²).

Exception: The authority having jurisdiction shall be permitted to establish the occupant load as the number of persons for which the existing means of egress is adequate, provided that measures are established to prevent occupancy by a greater number of persons.

Table 13.1.6 Construction Type Limitations

Type of Construction	Below LED	LED	Number of Levels above LED			
			1	2	3	4
I(443) ^{††} I(332) ^{††} II(222) ^{††}	Any assembly [§]	Any assembly	Any assembly	Any assembly	Any assembly	Any assembly; If OL > 1000 [§]
II(111) ^{††}	Any assembly [§] Limited to 1 level below LED	Any assembly	Any assembly	Any assembly; If OL > 1000 [§]	Assembly with OL ≤ 1000 [§]	NP
III(211) IV(2HH) V(111)	Any assembly [§] Limited to 1 level below LED	Any assembly	Any assembly	Any assembly; If OL > 300 [§]	Assembly with OL ≤ 1000 [§]	NP
II(000)	Assembly with OL ≤ 1000 [§] Limited to 1 level below LED	Any assembly; If OL > 1000 [§]	Assembly with OL ≤ 300 [§]	NP	NP	NP
III(200) V(000)	Assembly with OL ≤ 1000 [§] Limited to 1 level below LED	Any assembly; If OL > 1000 [§]	Assembly with OL ≤ 300 [§]	NP	NP	NP

NP: Not permitted.

LED: Level of exit discharge.

OL: Occupant load.

Note: For the purpose of this table, a mezzanine is not counted as a level.

[†]Where every part of the structural framework of roofs in Type I or Type II construction is 20 ft (6.1 m) or more above the floor immediately below, omission of all fire protection of the structural members shall be permitted, including protection of trusses, roof framing, decking, and portions of columns above 20 ft (6.1 m).

^{††}In open-air fixed seating facilities, including stadia, omission of fire protection of structural members exposed to the outside atmosphere shall be permitted where substantiated by an approved engineering analysis.

[§]Permitted if all the following are protected throughout by an approved automatic sprinkler system in accordance with Section 9.7:

(1) The level of the assembly occupancy

(2) Any level intervening between the level of the assembly occupancy and the level of exit discharge

(3) The level of the exit discharge if there are any openings between the level of exit discharge and the exits serving the assembly occupancy

13.1.7.2 Waiting Spaces. In theaters and other assembly occupancies where persons are admitted to the building at times when seats are not available, or when the permitted occupant load has been reached based on 13.1.7.1 and persons are allowed to wait in a lobby or similar space until seats or space is available, such use of a lobby or similar space shall not encroach upon the required clear width of exits. The waiting spaces shall be restricted to areas other than the required means of egress. Exits shall be provided for the waiting spaces on the basis of one person for each 3 ft² (0.28 m²) of waiting space area. Such exits shall be in addition to the exits specified for the main auditorium area and shall conform in construction and arrangement to the general rules for exits given in this chapter.

13.1.7.3 Where the occupant load of an assembly occupancy exceeds 6000, a life safety evaluation shall be performed in accordance with 13.4.1.

Exception: Where approved by the authority having jurisdiction, the number of usually seated occupants provided with not less than 15 ft² (1.4 m²) of lawn surface in outdoor facilities shall be permitted to be excluded in determining the need for a life safety evaluation.

SECTION 13.2 MEANS OF EGRESS REQUIREMENTS

13.2.1 General. All means of egress shall be in accordance with Chapter 7 and Section 13.2.

13.2.2 Means of Egress Components.

13.2.2.1 Components of means of egress shall be limited to the types described in 13.2.2.2 through 13.2.2.12.

13.2.2.2 Doors.

13.2.2.2.1 Doors complying with 7.2.1 shall be permitted.

13.2.2.2.2 Assembly occupancies with occupant loads of 300 or less in covered malls (*see exception to 37.4.4.1*) shall be permitted to have horizontal or vertical security grilles or doors complying with Exception No. 2 to 7.2.1.4.1 on the main entrance/exits.

13.2.2.2.3 Panic Hardware or Fire Exit Hardware. Any door in a required means of egress from an area having an occupant load of 100 or more persons 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.

Exception No. 1: In assembly occupancies having an occupant load not greater than 600, where the main exit consists of a single door or single pair of doors, locking devices complying with Exception No. 2 to 7.2.1.5.1 shall be permitted to be used on the main exit. Any latching device on such a door(s) shall be released by panic hardware.

Exception No. 2: This requirement shall not apply to delayed-egress locks as permitted in 13.2.2.2.4.

Exception No. 3: This requirement shall not apply to access-controlled egress doors as permitted in 13.2.2.2.5.

13.2.2.2.4 Delayed-egress locks complying with 7.2.1.6.1 shall be permitted on doors other than main entrance/exit doors.

13.2.2.2.5 Doors in the means of egress shall be permitted to be equipped with an approved access control system complying with 7.2.1.6.2. Doors shall not be locked from the egress side when the assembly occupancy is occupied. (See 7.2.1.1.3.)

13.2.2.2.6 Revolving doors complying with the requirements of 7.2.1.10 for new construction shall be permitted.

13.2.2.2.7 Turnstiles. No turnstiles or other devices that restrict the movement of persons shall be installed in any assembly occupancy in such a manner as to interfere with required means of egress facilities.

13.2.2.3 Stairs.

13.2.2.3.1 Stairs complying with 7.2.2 shall be permitted.

*Exception No. 1:** Stairs serving seating that is designed to be repositioned shall not be required to comply with 7.2.2.3.1.

Exception No. 2: This requirement shall not apply to stages and platforms as permitted by 13.4.5.

13.2.2.3.2 Catwalk, Gallery, and Gridiron Stairs.

13.2.2.3.2.1 Noncombustible grated stair treads and landing floors shall be permitted in means of egress from lighting and access catwalks, galleries, and gridirons.

13.2.2.3.2.2 Spiral stairs complying with 7.2.2.2.3 shall be permitted in means of egress from lighting and access catwalks, galleries, and gridirons.

13.2.2.4 Smokeproof Enclosures. Smokeproof enclosures complying with 7.2.3 shall be permitted.

13.2.2.5 Horizontal Exits. Horizontal exits complying with 7.2.4 shall be permitted.

13.2.2.6 Ramps. Ramps complying with 7.2.5 shall be permitted.

13.2.2.7 Exit Passageways. Exit passageways complying with 7.2.6 shall be permitted.

13.2.2.8 Escalators and Moving Walks. Escalators and moving walks complying with 7.2.7 shall be permitted.

13.2.2.9 Fire Escape Stairs. Fire escape stairs complying with 7.2.8 shall be permitted.

13.2.2.10 Fire Escape Ladders. Fire escape ladders complying with 7.2.9 shall be permitted.

13.2.2.11 Alternating Tread Devices. Alternating tread devices complying with 7.2.11 shall be permitted.

13.2.2.12 Areas of Refuge. Areas of refuge complying with 7.2.12 shall be permitted.

13.2.3 Capacity of Means of Egress.

13.2.3.1 The capacity of means of egress shall be in accordance with Section 7.3 or shall be in accordance with 13.2.3.2 for means of egress serving theater-type seating or similar seating arranged in rows.

13.2.3.2 Minimum clear widths of aisles and other means of egress serving theater-type seating, or similar seating arranged in rows, shall be in accordance with Table 13.2.3.2. The minimum clear widths shown shall be modified in accordance with all of the following:

(1) If risers exceed 7 in. (17.8 cm) in height, multiply the stair width in Table 13.2.3.2 by factor *A*, where

$$A = 1 + \frac{(\text{riser height} - 7 \text{ in.})}{5}$$

(2) Stairs without a handrail located within a 30-in. (76-cm) horizontal distance shall be 25 percent wider than otherwise calculated, that is, multiply by factor *B* = 1.25.

(3) Ramps steeper than 1 in 10 slope where used in ascent shall have their widths increased by 10 percent, that is, multiply by factor *C* = 1.10.

Exception No. 1: This requirement shall not apply to lighting and access catwalks as permitted by 13.4.5.9.

Exception No. 2: This requirement shall not apply to grandstands and folding and telescopic seating as permitted by 13.4.8 and 13.4.9.

Table 13.2.3.2 Capacity Factors

Number of Seats	Nominal Flow Time (sec)	Inch of Clear Width per Seat Served	
		Stairs	Passageways, Ramps, and Doorways
Unlimited	200	0.300 <i>AB</i>	0.220 <i>C</i>

Note: For SI units, 1 in. = 2.54 cm.

13.2.3.3 Main Entrance/Exit. Every assembly occupancy shall be provided with a main entrance/exit. The main entrance/exit shall be of sufficient width to accommodate one-half of the total occupant load and shall be at the level of exit discharge or shall connect to a stairway or ramp leading to a street. Where the main entrance/exit from an assembly occupancy is through a lobby or foyer, the aggregate capacity of all exits from the lobby or foyer shall be permitted to provide the required capacity of the main entrance/exit, regardless of whether all such exits serve as entrances to the building.

Exception No. 1: A bowling establishment shall have a main entrance/exit of sufficient capacity to accommodate 50 percent of the total occupant load without regard to the number of aisles that it serves.

*Exception No. 2:** In assembly occupancies where there is no well-defined main entrance/exit, exits shall be permitted to be distributed around the perimeter of the building, provided that the total exit width furnishes not less than 100 percent of the width needed to accommodate the permitted occupant load.

13.2.3.4 Other Exits. Each level of an assembly occupancy shall have access to the main entrance/exit and shall be provided with additional exits of sufficient width to accommodate not less than one-half of the total occupant load served by that level. Such exits shall discharge in accordance with 13.2.7. Such exits shall be located as far apart as practicable and as far from the main entrance/exit as practicable. The exits shall be accessible from a cross aisle or a side aisle. (See 13.2.3.3.)

Exception: In assembly occupancies where there is no well-defined main entrance/exit, exits shall be permitted to be distributed around the perimeter of the building, provided that the total exit width furnishes not less than 100 percent of the width required to accommodate the permitted occupant load.

13.2.4* Number of Exits.

13.2.4.1 The number of exits shall be in accordance with Section 7.4, other than fenced outdoor assembly occupancies in accordance with 13.2.4.2.

Exception: Assembly occupancies with occupant loads of 600 or fewer shall have two separate means of egress. Assembly occupancies with occupant loads greater than 600 but fewer than 1000 shall have three separate means of egress.

13.2.4.2 A fenced outdoor assembly occupancy shall have not less than two widely separated means of egress from the enclosure. If more than 6000 persons are to be served by such means of egress, there shall be not less than three means of egress; if more than 9000 persons are to be served, there shall be not less than four means of egress.

13.2.4.3 Balconies or mezzanines having an occupant load not exceeding 50 shall be permitted to be served by a single means of egress, and such means of egress shall be permitted to lead to the floor below.

13.2.4.4 Balconies or mezzanines having an occupant load exceeding 50 but not exceeding 100 shall have not less than two remote means of egress, but both such means of egress shall be permitted to lead to the floor below.

13.2.4.5 Balconies or mezzanines having an occupant load exceeding 100 shall have means of egress as described in 7.4.1.

13.2.4.6 A second means of egress shall not be required from lighting and access catwalks, galleries, and gridirons where a means of escape to a floor or a roof is provided. Ladders, alternating tread devices, or spiral stairs shall be permitted in such means of escape.

13.2.5 Arrangement of Means of Egress. (See also Section 7.5.)

13.2.5.1 Exits shall be located remotely from each other and shall be arranged to minimize the possibility that they might be blocked by any emergency.

Exception: A common path of travel shall be permitted for the first 20 ft (6.1 m) from any point where serving any number of occupants and for the first 75 ft (23 m) from any point where serving not more than 50 occupants.

13.2.5.2 Means of egress shall not be permitted through kitchens, storerooms, restrooms, closets, or hazardous areas as described in 13.3.2.

13.2.5.3 (Reserved.)

13.2.5.4 General Requirements for Access and Egress Routes Within Assembly Areas.

13.2.5.4.1 Festival seating shall be prohibited within a building. (See definition in 3.3.68.)

Exception No. 1: Festival seating shall be permitted in assembly occupancies having occupant loads of 1000 or less.

Exception No. 2: Festival seating shall be permitted in assembly occupancies where occupant loads exceed 1000 and where an approved life safety evaluation has been performed. (See 13.4.1.)

13.2.5.4.2* Access and egress routes shall be maintained so that any individual is able to move without undue hindrance, on personal initiative and at any time, from an occupied position to the exits.

13.2.5.4.3* Access and egress routes shall be maintained so that crowd management, security, and emergency medical

personnel are able to reach any individual at any time, without undue hindrance.

13.2.5.4.4* The width of aisle accessways and aisles shall provide sufficient egress capacity for the number of persons accommodated by the catchment area served by the aisle accessway or aisle in accordance with 13.2.3.1. Where aisle accessways or aisles converge to form a single path of egress travel, the required egress capacity of that path shall not be less than the combined required capacity of the converging aisle accessways and aisles.

13.2.5.4.5 Those portions of aisle accessways and aisles where egress is possible in either of two directions shall be uniform in required width.

Exception: This requirement shall not apply to those portions of aisle accessways where the required width, not including the seat space described by 13.2.5.7.2, does not exceed 12 in. (30.5 cm).

13.2.5.4.6 In the case of side boundaries for aisle accessways or aisles, other than those for nonfixed seating at tables, the clear width shall be measured to boundary elements such as walls, guardrails, handrails, edges of seating, tables, and side edges of treads. The measurement shall be made horizontally to the vertical projection of the elements, resulting in the smallest width measured perpendicularly to the line of travel.

13.2.5.5* Aisle Accessways Serving Seating Not at Tables.

13.2.5.5.1* To determine the required clear width of aisle accesses between rows of seating, horizontal measurements shall be made, between vertical planes, from the back of one seat to the front of the most forward projection of the seat immediately behind it. Where the entire row consists of automatic or self-rising seats that comply with ASTM F 851, *Test Method for Self-Rising Seat Mechanisms*, the measurement shall be permitted to be made with the seats in the up position.

13.2.5.5.2 The aisle accessway between rows of seating shall have a clear width of not less than 12 in. (30.5 cm), and this minimum shall be increased as a function of row length in accordance with 13.2.5.5.3 and 13.2.5.5.4.

Exception No. 1: If used by not more than four persons, there shall be no minimum clear width requirement for the portion of the aisle accessway having a length not exceeding 6 ft (1.8 m), measured from the center of the seat farthest from the aisle.

Exception No. 2: The number of seats between the farthest seat and an aisle in grandstands, bleachers, and folding and telescopic seating shall not exceed that shown in Table 13.2.5.5.2.

Table 13.2.5.5.2 Maximum Number of Seats Between Farthest Seat and an Aisle

Application	Outdoors	Indoors
Grandstands	11	6
Bleachers (see 13.2.5.6.1, Exception No. 1)	20	9

13.2.5.5.3* Rows of seating served by aisles or doorways at both ends shall not exceed 100 seats per row. The 12-in. (30.5-cm) minimum clear width of aisle accessway between such rows shall be increased by 0.3 in. (0.8 cm) for every seat over a total of 14 but shall not be required to exceed 22 in. (55.9 cm).

Exception: This requirement shall not apply to smoke-protected assembly seating as permitted by 13.4.2.4.

13.2.5.5.4 Rows of seating served by an aisle or doorway at one end only shall have a path of travel not exceeding 30 ft (9.1 m) in length from any seat to an aisle. The 12-in. (30.5-cm) minimum clear width of aisle accessway between such rows shall be increased by 0.6 in. (1.6 cm) for every seat over a total of seven.

Exception: This requirement shall not apply to smoke-protected assembly seating as permitted by 13.4.2.5 and 13.4.2.6.

13.2.5.5.5 Rows of seating using tablet-arm chairs shall be permitted only if the clear width of aisle accessways complies with the requirements of 13.2.5.6 where the tablet is in the usable position.

Exception: Tablet arms shall be permitted to be measured in the stored position where the tablet arm automatically returns to the stored position when raised manually to a vertical position in one motion and falls to the stored position by force of gravity.

13.2.5.5.6 The depth of seat boards shall not be less than 9 in. (23 cm) where the same level is not used for both seat boards and footboards. Footboards, independent of seats, shall be provided so that there is no horizontal opening that allows the passage of a $1/2$ -in. (1.3-cm) diameter sphere.

13.2.5.6 Aisles Serving Seating Not at Tables.

13.2.5.6.1 Aisles shall be provided so that the number of seats served by the nearest aisle is in accordance with 13.2.5.5.2 through 13.2.5.5.4.

Exception No. 1: Aisles shall not be required in bleachers, provided that all of the following conditions are met.

(a) Egress from the front row shall not be obstructed by a rail, a guard, or other obstruction.

(b) The row spacing shall be 28 in. (71.1 cm) or less.

(c) The rise per row, including the first row, shall be 6 in. (15.2 cm) or less.

(d) The number of rows shall not exceed 16.

(e) The seat spaces shall not be physically defined.

(f) Seat boards that are also used as stepping surfaces for descent shall provide a walking surface with a width of not less than 12 in. (30.5 cm), and, where there is a depressed footboard, the gap between seat boards of adjacent rows shall not exceed 12 in. (30.5 cm), measured horizontally. Leading edges of such surfaces shall be provided with a contrasting marking stripe so that the location of such leading edge is readily apparent, particularly where viewed in descent. Such stripe shall be not less than 1 in. (2.5 cm) wide and shall not exceed 2 in. (5.1 cm) in width. The marking stripe shall not be required where bleacher surfaces and environmental conditions, under all conditions of use, are such that the location of each leading edge is readily apparent, particularly when viewed in descent.

Exception No. 2: In seating composed entirely of bleachers for which the row-to-row dimension is 28 in. (71 cm) or less, and from which front egress is not limited, aisles shall not be required to exceed 66 in. (168 cm) in width. Such aisles shall not be considered as dead-end aisles.

13.2.5.6.2 Dead-end aisles shall not exceed 20 ft (6.1 m) in length.

Exception No. 1: A longer dead-end aisle shall be permitted where seats served by the dead-end aisle are not more than 24 seats from another aisle, measured along a row of seats having a clear width of not less than 12 in. (30.5 cm) plus 0.6 in. (1.5 cm) for each additional seat over a total of seven in the row.

Exception No. 2: A 16-row, dead-end aisle shall be permitted in folding and telescopic seating and grandstands.

13.2.5.6.3* The minimum clear width of aisles shall be sufficient to provide egress capacity in accordance with 13.2.3.2 but shall be not less than the following:

(1) 42 in. (107 cm) for stairs having seating on each side

Exception No. 1: The minimum clear width required by 13.2.5.6.3(1) shall be not less than 30 in. (76 cm) for catchment areas having not more than 60 seats.

Exception No. 2: The minimum clear width required by 13.2.5.6.3(1) shall be not less than 36 in. (91 cm) where an aisle does not serve more than 50 seats.

(2) 36 in. (91 cm) for stairs having seating on only one side, or 30 in. (76 cm) for catchment areas having not more than 60 seats

(3) 20 in. (51 cm) between a handrail and seating or between a guardrail and seating where the aisle is subdivided by a handrail

(4) 42 in. (107 cm) for level or ramped aisles having seating on both sides

Exception No. 1: The minimum clear width required by 13.2.3.2(4) shall be not less than 30 in. (76 cm) for catchment areas having not more than 60 seats.

Exception No. 2: The minimum clear width required by 13.2.3.2(4) shall be not less than 36 in. (91 cm) where an aisle does not serve more than 50 seats.

(5) 36 in. (91 cm) for level or ramped aisles having seating on only one side, or 30 in. (76 cm) for catchment areas having not more than 60 seats

(6) 23 in. (58 cm) between a handrail or guardrail and seating where aisle does not serve more than five rows on one side

13.2.5.6.4* Aisle Stairs and Ramps. Aisles having a gradient steeper than 1 in 20, but not steeper than 1 in 8, shall consist of a ramp. Aisles having a gradient steeper than 1 in 8 shall consist of an aisle stair. The exception to 13.2.5.6.8 shall not apply.

Exception No. 1: Aisles in folding and telescopic seating shall be permitted to be stepped aisles.

Exception No. 2: The limitation on height between landings in Tables 7.2.2.2.1(a) and (b) shall not apply to aisle stairs.

13.2.5.6.5 Aisle Stair Treads. Aisle stair treads shall meet the following criteria:

(1) There shall be no variation in the depth of adjacent treads that exceeds $3/16$ in. (0.5 cm).

*Exception No. 1:** In aisle stairs where a single intermediate tread is provided halfway between seating platforms, such intermediate treads shall be permitted to be of a relatively smaller but uniform depth but shall be not less than 13 in. (33 cm).

Exception No. 2: In grandstands, bleachers, and folding and telescopic seating, steps shall not be provided in aisles to overcome differences in level unless the gradient exceeds 1 ft in 10 ft (0.3 m in 3 m) of run. Where the rise of seating platform exceeds 11 in. (27.9 cm), an intermediate step shall be provided for the full width of the aisle and shall be proportioned to provide two steps of equal rise per platform. Where the rise of the seating platform exceeds 18 in. (45.7 cm), two intermediate steps for the full width of the aisle shall be provided and proportioned to provide three steps of equal rise per platform. The resulting treads shall be uniform and not less than 9 in. (22.9 cm). The full length of the nose of each step in the aisle shall be conspicuously marked.

- (2) *Treads shall be not less than 11 in. (27.9 cm).
- (3) All treads shall extend the full width of the aisle.

13.2.5.6.6 Aisle Stair Risers. Aisle stair risers shall meet the following criteria:

- (1) Riser heights shall be a minimum of 4 in. (10.2 cm).

Exception: The riser height of aisle stairs in folding and telescopic seating shall be permitted to be not less than 3¹/₂ in. (8.9 cm) and shall not exceed 11 in. (27.9 cm).

- (2) Riser heights shall not exceed 8 in. (20.3 cm).

Exception No. 1: Where the gradient of an aisle is steeper than 8 in. (20.3 cm) in rise in 11 in. (27.9 cm) of run to maintain necessary sight lines in the adjoining seating area, the riser height shall be permitted to exceed 8 in. (20.3 cm) but shall not exceed 11 in. (27.9 cm).

Exception No. 2: The riser height of aisle stairs in folding and telescopic seating shall be permitted to be not less than 3¹/₂ in. (8.9 cm) and shall not exceed 11 in. (27.9 cm).

- (3) Riser heights shall be designed to be uniform in each aisle, and the construction-caused nonuniformities shall not exceed 3³/₁₆ in. (0.5 cm) between adjacent risers.

Exception: Riser height shall be permitted to be nonuniform only for the purpose of accommodating changes in gradient necessary to maintain site lines within a seating area and shall be permitted to exceed 3³/₁₆ in. (0.5 cm) in any flight. Where nonuniformities exceed 3³/₁₆ in. (0.5 cm) between adjacent risers, the exact location of such nonuniformities shall be indicated by a distinctive marking stripe on each tread at the nosing or leading edge adjacent to the nonuniform risers.

13.2.5.6.7* Aisle Handrails. Ramped aisles having a gradient exceeding 1 in 12 and aisle stairs shall be provided with handrails at one side or along the centerline and in accordance with 7.2.2.4.5(1), (2), and (3).

Where seating exists on both sides of the aisle, the handrails shall be noncontinuous with gaps or breaks at intervals not exceeding five rows to facilitate access to seating and to allow crossing from one side of the aisle to the other. These gaps or breaks shall have a clear width of not less than 22 in. (55.9 cm) and shall not exceed 36 in. (91 cm), measured horizontally, and the handrail shall have rounded terminations or bends. Where handrails are provided in the middle of aisle stairs, an additional intermediate rail shall be located approximately 12 in. (30 cm) below the main handrail.

Exception No. 1: Handrails shall not be required for ramped aisles having a gradient not steeper than 1 in 8 and having seating on both sides.

Exception No. 2: The requirement for a handrail shall be satisfied by the use of a guard providing a rail that complies with the graspability requirements for handrails and shall be located at a consistent height between 34 in. and 42 in. (86 cm and 107 cm), measured vertically from the top of the rail to the leading edge (nosing) of stair treads or to the adjacent walking surface in the case of a ramp.

Exception No. 3: Handrails shall not be required where risers do not exceed 7 in. (17.8 cm) in height.

13.2.5.6.8* Aisle Marking. A contrasting marking stripe shall be provided on each tread at the nosing or leading edge so that the location of such tread is readily apparent, particularly when viewed in descent. Such stripes shall be not less than 1 in. (2.5 cm) wide and shall not exceed 2 in. (5 cm) in width.

Exception: The marking stripe shall not be required where tread surfaces and environmental conditions, under all conditions of use, are such that the location of each tread is readily apparent, particularly when viewed in descent.

13.2.5.7* Aisle Accessways Serving Seating at Tables.

13.2.5.7.1 The required clear width of an aisle accessway shall be not less than 12 in. (30.5 cm) where measured in accordance with 13.2.5.7.2 and shall be increased as a function of length in accordance with 13.2.5.7.3.

Exception: If used by not more than four persons, no minimum clear width shall be required for the portion of aisle accessway having a length not exceeding 6 ft (1.8 m) and located farthest from an aisle.*

13.2.5.7.2* Where nonfixed seating is located between a table and an aisle accessway or aisle, the measurement of required clear width of the aisle accessway or aisle shall be made to a line 19 in. (48.3 cm) away from the edge of the table. The 19-in. (48.3-cm) distance shall be measured perpendicularly to the edge of the table.

13.2.5.7.3* The minimum required clear width of an aisle accessway, measured in accordance with 13.2.5.4.6 and 13.2.5.7.2, shall be increased beyond the 12-in. (30.5-cm) requirement of 13.2.5.7.1 by 0.5 in. (1.3 cm) for each additional 12 in. (30.5 cm) or fraction thereof beyond 12 ft (3.7 m) of aisle accessway length, where measured from the center of the seat farthest from an aisle.

13.2.5.7.4 The path of travel along the aisle accessway shall not exceed 36 ft (10.9 m) from any seat to the closest aisle or egress doorway.

13.2.5.8 Aisles Serving Seating at Tables.

13.2.5.8.1* Aisles that contain steps or that are ramped, such as aisles serving dinner theater-style configurations, shall comply with the requirements of 13.2.5.6.

13.2.5.8.2* The width of aisles serving seating at tables shall be not less than 44 in. (112 cm) where serving an occupant load exceeding 50, and 36 in. (91 cm) where serving an occupant load of 50 or fewer.

13.2.5.8.3* Where nonfixed seating is located between a table and an aisle, the measurement of required clear width of the aisle shall be made to a line 19 in. (48.3 cm) away from the edge of the table. The 19-in. (48.3-cm) distance shall be measured perpendicularly to the edge of the table.

13.2.5.9 Approval of Layouts. Where required by the authority having jurisdiction, plans drawn to scale showing the arrangement of furnishings or equipment shall be submitted to the authority by the building owner, manager, or authorized agent to substantiate conformance with the provisions of 13.2.5. Such plans shall constitute the only acceptable arrangement until revised or until additional plans are submitted and approved.

Exception: Temporary deviations from the specifications of the approved plans shall be permitted, provided that the occupant load is not increased and the intent of 13.2.5.9 is maintained.

13.2.6 Travel Distance to Exits. Exits shall be arranged so that the total length of travel from any point to reach an exit shall not exceed 150 ft (45 m) in any assembly occupancy.

Exception No. 1: The travel distance shall not exceed 200 ft (60 m) in assembly occupancies protected throughout by an approved automatic sprinkler system in accordance with Section 9.7.

Exception No. 2: This requirement shall not apply to smoke-protected assembly seating as permitted by 13.4.2.8 and its exception.

13.2.7 Discharge from Exits.

13.2.7.1 Exit discharge shall comply with Section 7.7.

13.2.7.2 The level of exit discharge shall be measured at the point of principal entrance to the building.

13.2.7.3 Where the principal entrance to an assembly occupancy is via a terrace, either raised or depressed, such terrace shall be permitted to be considered to be the level of exit discharge for the purposes of Table 13.1.6 where the following criteria are met:

- (1) The terrace is at least as long, measured parallel to the building, as the total width of the exit(s) it serves, but not less than 5 ft (1.5 m) long.
- (2) The terrace is at least as wide, measured perpendicularly to the building, as the exit(s) it serves, but not less than 5 ft (1.5 m) wide.
- (3) Required stairs leading from the terrace to grade are protected in accordance with 7.2.2.6.3 or are not less than 10 ft (3 m) from the building.

13.2.8 Illumination of Means of Egress. Means of egress, other than for private party tents not exceeding 1200 ft² (111.5 m²), shall be illuminated in accordance with Section 7.8.

13.2.9 Emergency Lighting. Emergency lighting shall be provided in accordance with Section 7.9. Private party tents not exceeding 1200 ft² (111.5 m²) shall not be required to have emergency lighting.

Exception: Assembly occupancies with an occupant load not exceeding 300 and used exclusively for a place of worship shall not be required to have emergency lighting.

13.2.10 Marking of Means of Egress. Means of egress shall have signs in accordance with Section 7.10.

Exception: Exit markings shall not be required on the seating side of vomitories from seating areas where exit marking is provided in the concourse and where such marking is readily apparent from the vomitories.

13.2.11 Special Means of Egress Features.

13.2.11.1 Guards and Railings.

13.2.11.1.1 Boxes, Balconies, and Galleries. Boxes, balconies, and galleries shall meet the following criteria:

- (1) The fasciae of boxes, balconies, and galleries shall rise not less than 26 in. (66 cm) above the adjacent floor or shall have substantial railings not less than 26 in. (66 cm) above the adjacent floor.
- (2) The height of the rail above footrests on the adjacent floor immediately in front of a row of seats shall be not less than 26 in. (66 cm). Railings at the ends of aisles shall be not less than 36 in. (91 cm) high for the full width of the aisle and shall be not less than 42 in. (107 cm) high for the width of the aisle where steps occur.

Exception: Existing railings 36 in. (91 cm) high at the ends of aisles where steps occur shall be permitted to be continued to be used.

- (3) Aisle accessways adjacent to orchestra pits and vomitories, and all cross aisles, shall be provided with railings not less than 26 in. (66 cm) above the adjacent floor.

Exception: The requirement of 13.2.11.1.1(3) shall not apply where the backs of seats located at the front of the aisle project 24 in. (61 cm) or more above the adjacent floor of the aisle.

- (4) Guardrails shall not be required on the audience side of stages, raised platforms, and other raised floor areas such as runways, ramps, and side stages used for entertainment or presentations.
- (5) Permanent guardrails shall not be required at vertical openings in the performance area of stages.
- (6) Guardrails shall not be required where the side of an elevated walking surface is required to be open for the normal functioning of special lighting or for access and use of other special equipment.

SECTION 13.3 PROTECTION

13.3.1 Protection of Vertical Openings. Any vertical opening shall be enclosed or protected in accordance with 8.2.5.

*Exception No. 1: * Stairs or ramps shall be permitted to be unenclosed between balconies or mezzanines and main assembly areas located below, provided that the balcony or mezzanine is open to the main assembly area.*

Exception No. 2: Exit access stairs from lighting and access catwalks, galleries, and gridirons shall not be required to be enclosed.

Exception No. 3: Assembly occupancies protected by an approved, supervised automatic sprinkler system in accordance with Section 9.7 shall be permitted to have unprotected vertical openings in accordance with 8.2.5.8.

Exception No. 4: Use of the following alternative materials shall be permitted:

- (a) Existing wood lath and plaster
- (b) Existing ¹/₂-in. (1.3-cm) gypsum wallboard
- (c) Existing installations of ¹/₄-in. (0.6-cm) thick wired glass that are, or are rendered, inoperative and fixed in the closed position
- (d) Other existing materials having similar fire resistance capabilities

All such assemblies shall be in good repair and free of any condition that would diminish their original fire resistance characteristics.

13.3.2 Protection from Hazards.

13.3.2.1 Service Equipment, Hazardous Operations or Processes, and Storage Facilities.

13.3.2.1.1 Rooms containing high-pressure boilers, refrigerating machinery of other than the domestic refrigerator type, large transformers, or other service equipment subject to explosion shall not be located directly under or abutting required exits. All such rooms shall be separated from other parts of the building by fire barriers in accordance with 8.2.3 that have a fire resistance rating of not less than 1 hour or shall be protected by automatic extinguishing systems in accordance with Section 8.4.

13.3.2.1.2 Vents to the outer air shall be provided in accordance with Section 8.4.

13.3.2.1.3 Rooms or spaces for the storage, processing, or use of materials specified in 13.3.2.1.3(1) through (3) shall be protected in accordance with the following:

- (1) *Separation from the remainder of the building by fire barriers having a fire resistance rating of not less than 1 hour or protection of such rooms by automatic extinguishing systems as specified in Section 8.4 in the following areas:

- a. Boiler and furnace rooms

Exception: The requirement of 13.3.2.1.3(1)a shall not apply to rooms enclosing furnaces, heating and air-handling equipment, or compressor equipment with a total aggregate input rating less than 200,000 Btu. Such rooms shall not be used for storage unless otherwise protected as required. For installations in attics, the draftstopping requirements of 8.2.7.1(2) shall apply.

- b. Rooms or spaces used for the storage of combustible supplies in quantities deemed hazardous by the authority having jurisdiction
 - c. Rooms or spaces used for the storage of hazardous materials or flammable or combustible liquids in quantities deemed hazardous by recognized standards
- (2) Separation from the remainder of the building by fire barriers having a fire resistance rating of not less than 1 hour and protection of such rooms by automatic extinguishing systems as specified in Section 8.4 in the following areas:
- a. Laundries
 - b. Maintenance shops, including woodworking and painting areas
 - c. Rooms or spaces used for processing or use of combustible supplies deemed hazardous by the authority having jurisdiction
 - d. Rooms or spaces used for processing or use of hazardous materials or flammable or combustible liquids in quantities deemed hazardous by recognized standards
- (3) Where automatic extinguishing is used to meet the requirements of 13.3.2, the protection shall be permitted to be in accordance with 9.7.1.2.

13.3.3 Interior Finish.

13.3.3.1 Interior finish shall be in accordance with Section 10.2.

13.3.3.2 Interior wall and ceiling finish materials complying with 10.2.3 shall be Class A or Class B in all corridors and lobbies and shall be Class A in enclosed stairways.

13.3.3.3 Interior wall and ceiling finish materials complying with 10.2.3 shall be Class A or Class B in general assembly areas having occupant loads of more than 300, and shall be Class A, Class B, or Class C in assembly areas having occupant loads of 300 or fewer.

13.3.3.4 Screens on which pictures are projected shall comply with requirements of Class A or Class B interior finish in accordance with 10.2.3.

13.3.3.5 Interior Floor Finish. (No requirements.)

13.3.4 Detection, Alarm, and Communications Systems.

13.3.4.1 General. Assembly occupancies with occupant loads of more than 300 and all theaters with more than one audience-viewing room shall be provided with an approved fire alarm system in accordance with 9.6.1 and 13.3.4.

Exception No. 1: Assembly occupancies that are a part of a mixed occupancy (see 6.1.14) shall be permitted to be served by a common fire alarm system, provided that the individual requirements of each occupancy are met.

Exception No. 2: Voice communication or public address systems complying with 13.3.4.3.3 shall not be required to comply with 9.6.1.

Exception No. 3: This requirement shall not apply to assembly occupancies where, in the judgment of the authority having jurisdiction, adequate alternative provisions exist or are provided for the discovery of a fire and for alerting the occupants promptly.

13.3.4.2 Initiation.

13.3.4.2.1 Initiation of the required fire alarm system shall be by manual means in accordance with 9.6.2.1(1), and the system shall be provided with an emergency power source. The initiating device shall be capable of transmitting an alarm to a receiving station, located within the building, that is constantly attended when the assembly occupancy is occupied.

Exception No. 1: This requirement shall not apply to fire alarm systems initiated by means of an approved automatic fire detection system in accordance with 9.6.2.1(2) that provides fire detection throughout the building.

Exception No. 2: This requirement shall not apply to fire alarm systems initiated by means of an approved automatic sprinkler system in accordance with 9.6.2.1(3) that provides fire detection and protection throughout the building.

13.3.4.2.2* In assembly occupancies with occupant loads of more than 300, automatic detection shall be provided in all hazardous areas that are not normally occupied, unless such areas are protected throughout by an approved automatic sprinkler system in accordance with Section 9.7.

13.3.4.3 Notification.

13.3.4.3.1 The required fire alarm system shall sound an audible alarm in a constantly attended receiving station within the building when occupied for purposes of initiating emergency action. A presignal system in accordance with 9.6.3.3 shall be permitted. Positive alarm sequence in accordance with 9.6.3.4 shall be permitted.

13.3.4.3.2 Occupant notification shall be by means of voice announcements, either live or prerecorded, initiated by the person in the constantly attended location.

13.3.4.3.3 The announcement shall be made via an approved voice communication or public address system that is audible above the ambient noise level of the assembly occupancy.

13.3.4.3.4 Where the authority having jurisdiction determines that a constantly attended location is impractical, a fire alarm system in accordance with Section 9.6 shall be used that meets the following criteria:

- (1) It shall be initiated by manual fire alarm boxes in accordance with 9.6.2.1(1) or other approved means.
- (2) It shall automatically provide prerecorded evacuation instructions in accordance with 9.6.3.10.

13.3.5 Extinguishment Requirements. (See also 13.1.6, 13.2.6, and 13.3.2.)

13.3.5.1 Fire Suppression Systems. Any assembly occupancy used or capable of being used for exhibition or display purposes shall be protected throughout by an approved automatic sprinkler system in accordance with Section 9.7 where the exhibition or display area exceeds 15,000 ft² (1400 m²).

Exception No. 1: In stadia and arenas, sprinklers shall be permitted to be omitted over the floor area used for contest, performance, or entertainment, over the seating areas, and over open-air concourses where an approved engineering analysis substantiates the ineffectiveness of the sprinkler protection due to building height and combustible loading.

Exception No. 2: In unenclosed stadia and arenas, sprinklers shall be permitted to be omitted in the following areas:

- (a) Press boxes less than 1000 ft² (93 m²)
- (b) Storage facilities less than 1000 ft² (93 m²) where enclosed with not less than 1-hour fire resistance-rated construction
- (c) Enclosed areas underneath grandstands that comply with 13.4.8.5

13.3.5.2 High-Rise Buildings. (See 13.4.4.)

13.3.6 Corridors. (No requirement.)

SECTION 13.4 SPECIAL PROVISIONS

13.4.1 Life Safety Evaluation.

13.4.1.1* Where a life safety evaluation is required by other provisions of the *Code*, it shall be performed by persons acceptable to the authority having jurisdiction. The life safety evaluation shall include a written assessment of safety measures for conditions listed in 13.4.1.2. The life safety evaluation shall be approved annually by the authority having jurisdiction and shall be updated for special or unusual conditions.

13.4.1.2 Life safety evaluations shall include an assessment of the following conditions and the related appropriate safety measures:

- (1) Nature of the events and the participants and attendees
- (2) Access and egress movement, including crowd density problems
- (3) Medical emergencies
- (4) Fire hazards
- (5) Permanent and temporary structural systems
- (6) Severe weather conditions
- (7) Earthquakes
- (8) Civil or other disturbances
- (9) Hazardous materials incidents within and near the facility
- (10) Relationships among facility management, event participants, emergency response agencies, and others having a role in the events accommodated in the facility

13.4.1.3* Life safety evaluations shall include assessments of both building systems and management features upon which reliance is placed for the safety of facility occupants. Such assessments shall consider scenarios appropriate to the facility.

13.4.2* Smoke-Protected Assembly Seating.

13.4.2.1 Fire Protection Requirements. To be considered smoke protected, an assembly seating facility shall comply with the following:

- (1) All enclosed areas with walls and ceilings in buildings or structures containing smoke-protected assembly seating shall be protected with an approved automatic sprinkler system in accordance with Section 9.7.

Exception No. 1: The requirement of 13.4.2.1(1) shall not apply to the floor area used for the contest, performance, or entertainment, provided that the roof construction is more than 50 ft (15 m) above the floor level and use is restricted to low fire hazard uses.

Exception No. 2: Sprinklers required by 13.4.2.1(1) shall be permitted to be omitted over the floor area used for contest, performance, or entertainment and over the seating areas where an approved engineering analysis substantiates the ineffectiveness of the sprinkler protection due to building height and combustible loading.*

- (2) All means of egress serving a smoke-protected assembly seating area shall be provided with smoke-actuated venti-

lation facilities or natural ventilation designed to maintain the level of smoke at not less than 6 ft (1.8 m) above the floor of the means of egress.

13.4.2.2 Life Safety Evaluation. To use the provisions of smoke-protected assembly seating, a facility shall be subject to a life safety evaluation in accordance with 13.4.1.

13.4.2.3 Where using Table 13.4.2.3, the number of seats specified shall be within a single assembly space, and interpolation shall be permitted between the specific values shown. The minimum clear widths shown shall be modified in accordance with all of the following:

- (1) If risers exceed 7 in. (17.8 cm) in height, multiply the stair width in Table 13.4.2.3 by factor *A*, where

$$A = 1 + \frac{(\text{riser height} - 7 \text{ in.})}{5}$$

- (2) Stairs without a handrail located within a 30-in. (76-cm) horizontal distance shall be 25 percent wider than otherwise calculated, that is, multiply by factor *B* = 1.25.
- (3) Ramps steeper than 1 in 10 slope where used in ascent shall have their width increased by 10 percent, that is, multiply by factor *C* = 1.10.

Table 13.4.2.3 Capacity Factors

Number of Seats	Nominal Flow Time (sec)	Inch of Clear Width per Seat Served	
		Stairs	Passageways, Ramps, and Doorways
2,000	200	0.300 <i>AB</i>	0.200 <i>C</i>
5,000	260	0.200 <i>AB</i>	0.150 <i>C</i>
10,000	360	0.130 <i>AB</i>	0.100 <i>C</i>
15,000	460	0.096 <i>AB</i>	0.070 <i>C</i>
20,000	560	0.076 <i>AB</i>	0.056 <i>C</i>
25,000 or more	600	0.060 <i>AB</i>	0.044 <i>C</i>

Note: For SI units, 1 in. = 2.54 cm.

13.4.2.4 Where smoke-protected assembly seating conforms to the requirements of 13.4.2, for rows of seats served by aisles or doorways at both ends, the number of seats per row shall not exceed 100, and the clear width of not less than 12 in. (305 cm) for aisle accessways shall be increased by 0.3 in. (0.8 cm) for every additional seat beyond the number stipulated in Table 13.4.2.4; however, the minimum clear width shall not be required to exceed 22 in. (55.9 cm).

13.4.2.5 Where smoke-protected assembly seating conforms with the requirements of 13.4.2, for rows of seats served by an aisle or doorway at one end only, the aisle accessway clear width of not less than 12 in. (30.5 cm) shall be increased by 0.6 in. (1.6 cm) for every additional seat beyond the number stipulated in Table 13.4.2.4; however, the minimum clear width shall not be required to exceed 22 in. (55.9 cm).

13.4.2.6 Smoke-protected assembly seating conforming with the requirements of 13.4.2 shall be permitted to have a common path of travel of 50 ft (15 m) from any seat to a point where a person has a choice of two directions of egress travel.

Table 13.4.2.4 Smoke-Protected Assembly Seating

Total Number of Seats in the Space	Number of Seats per Row Permitted to Have a Clear Width Aisle Accessway of Not Less than 12 in. (30.5 cm)	
	Aisle or Doorway at Both Ends of Row	Aisle or Doorway at One End of Row
<4,000	14	7
4,000–6,999	15	7
7,000–9,999	16	8
10,000–12,999	17	8
13,000–15,999	18	9
16,000–18,999	19	9
19,000–21,999	20	10
≥22,000	21	11

13.4.2.7 Aisle Termination. Where smoke-protected assembly seating conforms to the requirements of 13.4.2, the dead ends in aisle stairs shall not exceed a distance of 21 rows.

Exception: A longer dead-end aisle shall be permitted for smoke-protected assembly seating where seats served by the dead-end aisle are not more than 40 seats from another aisle, measured along a row of seats having an aisle accessway with a clear width of not less than 12 in. (30.5 cm) plus 0.3 in. (0.8 cm) for each additional seat above seven in the row.

13.4.2.8 Where smoke-protected assembly seating conforms to the requirements of 13.4.2.1, the travel distance from each seat to the nearest entrance to an egress vomitory portal or egress concourse shall not exceed 400 ft (122 m). The travel distance from the entrance to the vomitory portal or from the egress concourse to an approved egress stair, ramp, or walk at the building exterior shall not exceed 200 ft (60 m).

Exception: In outdoor assembly seating facilities of Type I or Type II construction, where all portions of the means of egress are essentially open to the outside, the travel distance shall not be limited.

13.4.3 Windowless or Underground Buildings. Windowless or underground buildings shall comply with Section 11.7.

13.4.4 High-Rise Buildings. Existing high-rise buildings that house assembly occupancies in high-rise portions of the building shall have the highest level of the assembly occupancy and all levels below protected by an approved, supervised automatic sprinkler system in accordance with Section 9.7. (See also 13.1.6.)

13.4.5 Stages and Platforms. (See 3.3.166 and 3.3.134.)

13.4.5.1 Materials and Design. (Reserved.)

13.4.5.2 Platform Construction. (Reserved.)

13.4.5.3 Stage Construction. (Reserved.)

13.4.5.4 Accessory Rooms. (Reserved.)

13.4.5.5 Ventilators. Regular stages in excess of 1000 ft² (93 m²) and legitimate stages shall be provided with emergency ventilation to provide a means of removing smoke and combustion gases directly to the outside in the event of a fire. Ventilation shall be by one or a combination of the following methods.

(a) *Smoke Control.* A means complying with Section 9.3 shall be provided to maintain the smoke level at not less than 6 ft (183 cm) above the highest level of assembly seating or above the top of the proscenium opening where a proscenium wall and opening protection are provided. The system shall be activated independently by each of the following:

- (1) Activation of the sprinkler system in the stage area
- (2) Activation of smoke detectors over the stage area
- (3) Activation by manually operated switch at an approved location

The emergency ventilation system shall be supplied by both normal and standby power. The fan(s) power wiring and ducts shall be located and properly protected to ensure not less than 20 minutes of operation in the event of activation.

(b) *Roof Vents.* Two or more vents shall be located near the center of and above the highest part of the stage area. They shall be raised above the roof and shall provide a net-free vent area equal to 5 percent of the stage area. Vents shall be constructed to open automatically by approved heat-activated devices. Supplemental means shall be provided for manual operation and periodic testing of the ventilator from the stage floor. Vents shall be labeled.

Exception: Existing roof vents that are not labeled shall be permitted to conform to the following requirements.

(a) *Vents shall open by spring action or force of gravity sufficient to overcome the effects of neglect, rust, dirt, frost, snow, or expansion by heat or warping of the framework. Glass, if used in vents, shall be protected against falling onto the stage. A wire screen, if used under the glass, shall be placed so that if clogged, it does not reduce the required venting area, interfere with the operating mechanism, or obstruct the distribution of water from an automatic sprinkler. Vents shall be arranged to open automatically by the use of fusible links. The fusible links and operating cable shall hold each door closed against the minimum 30-lb (133-N) counterforce that shall be exerted on each door through its entire arc of travel and for not less than 115 degrees. A manual control shall be provided.*

(b) *Springs, where employed to actuate vent doors, shall be capable of maintaining full required tension. Springs shall not be stressed more than 50 percent of their rated capacity and shall not be located directly in the airstream nor exposed to the outside.*

(c) *A fusible link shall be placed in the cable control system on the underside of the vent at or above the roofline, or as approved by the building official, and shall be located so as not to be affected by the operation of an automatic sprinkler system. Remote, manual, or electric controls shall provide for both opening and closing of the vent doors for periodic testing and shall be located at a point on stage designated by the authority having jurisdiction. Where remote control vents are electrical, power failure shall not affect instant operation of the vent in the event of fire. Hand winches shall be permitted to be employed to facilitate operation of manually controlled vents.*

(c) *Other Means.* Approved, alternate means of removing smoke and combustion gases shall be permitted.

13.4.5.6 Proscenium Walls. (Reserved.)

13.4.5.7 Proscenium Curtain. The proscenium opening of every legitimate stage shall be provided with a curtain constructed and mounted so as to intercept hot gases, flames, and smoke and to prevent flame from a fire on the stage from becoming visible from the auditorium side for a 5-minute period where the curtain is of asbestos. Other materials shall be permitted if they have passed a 30-minute fire test in a small-scale 3-ft × 3-ft (0.9-m × 0.9-m) furnace with the sample

mounted in the horizontal plane at the top of the furnace and subjected to the standard time-temperature curve.

The curtain shall be automatic-closing without the use of applied power.

All proscenium curtains shall be in the closed position, except during performances, rehearsals, or similar activities.

Exception No. 1: In lieu of the protection required herein, all the following shall be provided.

(a) A noncombustible opaque fabric curtain shall be arranged so that it closes automatically.

(b) An automatic, fixed waterspray deluge system shall be located on the auditorium side of the proscenium opening and shall be arranged so that the entire face of the curtain will be wetted. The system shall be activated by combination of rate-of-rise and fixed-temperature detectors located on the ceiling of the stage. Detectors shall be spaced in accordance with their listing. The water supply shall be controlled by a deluge valve and shall be sufficient to keep the curtain completely wet for 30 minutes or until the valve is closed by fire department personnel.

(c) The curtain shall be automatically operated in case of fire by a combination of rate-of-rise and fixed-temperature detectors that also activates the deluge spray system. Stage sprinklers and vents shall be automatically operated by fusible elements in case of fire.

(d) Operation of the stage sprinkler system or spray deluge valve shall automatically activate the emergency ventilating system and close the curtain.

(e) The curtain, vents, and spray deluge system valve shall also be capable of manual operation.

Exception No. 2: This requirement shall not apply to proscenium fire curtains or water curtains complying with 12.4.5.7.

13.4.5.8 Gridirons, Fly Galleries, and Pinrails. (Reserved.)

13.4.5.9 Catwalks. The clear width of lighting and access catwalks and the means of egress from galleries and gridirons shall be not less than 22 in. (56 cm).

13.4.5.10 Fire Protection. Every stage shall be protected by an approved automatic sprinkler system in compliance with Section 9.7. The protection shall be provided throughout the stage and in storerooms, workshops, permanent dressing rooms, and other accessory spaces contiguous to such stages.

Exception No. 1: Sprinklers shall not be required for stages 1000 ft² (93 m²) or less in area where curtains, scenery, or other combustible hangings are not retractable vertically. Combustible hangings shall be limited to a single main curtain, borders, legs, and a single backdrop.

Exception No. 2: Sprinklers shall not be required under stage areas less than 4 ft (1.2 m) in clear height used exclusively for chair or table storage and lined on the inside with ⁵/₈-in. (1.6-cm) Type X gypsum wallboard or the approved equivalent.

13.4.5.11 Flame-Retardant Requirements. Combustible scenery of cloth, film, vegetation (dry), and similar materials shall meet the requirements of NFPA 701, *Standard Methods of Fire Tests for Flame Propagation of Textiles and Films*. Foamed plastics (see definition of cellular or foamed plastic in 3.3.28) shall be permitted to be used only by specific approval of the authority having jurisdiction. Scenery and stage properties on thrust stages shall be of either noncombustible or limited-combustible materials.

13.4.5.12* Standpipes. Stages over 1000 ft² (93 m²) in area shall be equipped with 1¹/₂-in. (38-mm) hose lines for first aid fire fighting at each side of the stage. Hose connections shall

be in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*, unless Class II or Class III standpipes in accordance with NFPA 14, *Standard for the Installation of Standpipe, Private Hydrants, and Hose Systems*, are used.

13.4.6 Projection Booths.

13.4.6.1 Film or video projectors or spotlights using light sources that produce particulate matter or toxic gases, or light sources that produce hazardous radiation without protective shielding, shall be located within a projection room complying with 13.3.2.1.3. Where cellulose nitrate film is used, the projection room shall comply with NFPA 40, *Standard for the Storage and Handling of Cellulose Nitrate Motion Picture Film*.

13.4.6.2 Projection Rooms for Safety Film. Projection rooms for safety film shall comply with 13.4.6.2.1 through 13.4.6.2.6.

13.4.6.2.1 Every projection room for safety film shall be of permanent construction consistent with the construction requirements for the type of building in which the projection room is located. Openings shall not be required to be protected. The room shall have a floor area of not less than 80 ft² (7.4 m²) for a single machine and not less than 40 ft² (3.7 m²) for each additional machine. Each motion picture projector, floodlight, spotlight, or similar piece of equipment shall have a clear working space of not less than 30 in. (76 cm) on each side and at its rear, but only one such space shall be required between adjacent projectors.

The projection room and the rooms appurtenant to it shall have a ceiling height of not less than 7 ft 6 in. (2.3 m).

13.4.6.2.2 Each projection room for safety film shall have not less than one out-swinging, self-closing door not less than 30 in. (76 cm) wide and 6 ft 8 in. (2 m) high.

13.4.6.2.3 The aggregate of ports and openings for projection equipment shall not exceed 25 percent of the area of the wall between the projection room and the auditorium. All openings shall be provided with glass or other approved material so as to completely close the opening.

13.4.6.2.4 Projection room ventilation shall be not less than the following.

(a) *Supply Air.* Each projection room shall be provided with adequate air supply inlets arranged to provide well-distributed air throughout the room. Air inlet ducts shall provide an amount of air equivalent to the amount of air being exhausted by projection equipment. Air shall be permitted to be taken from the outside; from adjacent spaces within the building, provided that the volume and infiltration rate is sufficient; or from the building air conditioning system, provided that it is arranged to supply sufficient air whether or not other systems are in operation.

(b) *Exhaust Air.* Projection booths shall be permitted to be exhausted through the lamp exhaust system. The lamp exhaust system shall be positively interconnected with the lamp so that the lamp cannot operate unless there is sufficient airflow required for the lamp. Exhaust air ducts shall terminate at the exterior of the building in such a location that the exhaust air cannot be readily recirculated into any air supply system. The projection room ventilation system shall be permitted also to serve appurtenant rooms, such as the generator room and the rewind room.

13.4.6.2.5 Each projection machine shall be provided with an exhaust duct that draws air from each lamp and exhausts it directly to the outside of the building. The lamp exhaust shall

be permitted to exhaust air from the projection room to provide room air circulation. Such ducts shall be of rigid materials, except for a flexible connector approved for the purpose. The projection lamp and projection room exhaust systems shall be permitted to be combined but shall not be interconnected with any other exhaust system or return-air system within the buildings. Specifications for electric arc and xenon projection equipment follow.

(a) *Electric Arc Projection Equipment.* The exhaust capacity shall be 200 ft³/min (0.09 m³/s) for each lamp connected to the lamp exhaust system, or as recommended by the equipment manufacturer. Auxiliary air shall be permitted to be introduced into the system through a screened opening to stabilize the arc.

(b) *Xenon Projection Equipment.* The lamp exhaust system shall exhaust not less than 300 ft³/min (0.14 m³/s) per lamp, or not less than that exhaust volume required or recommended by the equipment manufacturer, whichever is greater.

13.4.6.2.6 Miscellaneous equipment and storage shall be protected as follows:

- (1) Each projection room shall be provided with rewind and film storage facilities.
- (2) Flammable liquids containers shall be permitted in projection rooms, provided that the following criteria are met:
 - a. There are not more than four containers per projection room
 - b. No container has capacity exceeding 16 oz (0.5 L)
 - c. Containers are of a nonbreakable type
- (3) Appurtenant electrical equipment, such as rheostats, transformers, and generators, shall be permitted to be located within the booth or in a separate room of equivalent construction.

13.4.6.3 Projection Room Posting. A conspicuous sign with 1-in. (2.5-cm) block letters shall be posted on the outside of each projection room door, and within the projection room proper, unless the projection room is constructed in accordance with NFPA 40, *Standard for the Storage and Handling of Cellulose Nitrate Motion Picture Film*. The sign shall state the following:

SAFETY FILM ONLY PERMITTED IN THIS ROOM

13.4.7* Special Amusement Buildings.

13.4.7.1 Special amusement buildings, regardless of occupant load, shall meet the requirements for assembly occupancies in addition to the requirements of 13.4.7, unless the building is a building in which the multilevel play structures are not more than 10 ft (3 m) in height and have aggregate horizontal projections not exceeding 160 ft² (14.9 m²).

13.4.7.2* Every special amusement building, other than buildings or structures not exceeding 10 ft (3 m) in height and not exceeding 160 ft² (14.9 m²) in horizontal projection, shall be protected throughout by an approved automatic sprinkler system installed and maintained in accordance with Section 9.7. Where the special amusement building is movable or portable, the sprinkler water supply shall be permitted to be provided by an approved, temporary means.

13.4.7.3 Where the nature of the special amusement building is such that it operates in reduced lighting levels, the building shall be protected throughout by an approved automatic smoke detection system in accordance with Section 9.6. Actua-

tion of any smoke detection system device shall sound an alarm at a constantly attended location on the premises. Actuation of the automatic sprinkler system, or any other suppression system, or actuation of a smoke detection system having an approved verification or cross-zoning operation capability shall provide the following:

- (1) Cause illumination in the means of egress to increase to that required by Section 7.8
- (2) Stop any conflicting or confusing sounds and visuals

13.4.7.4 Exit Marking.

13.4.7.4.1 Exit marking shall be in accordance with Section 7.10.

13.4.7.4.2 Floor proximity exit signs shall be provided in accordance with 7.10.1.5.

13.4.7.4.3* In special amusement buildings where mazes, mirrors, or other designs are used to confound the egress path, approved directional exit marking that becomes apparent in an emergency shall be provided.

13.4.7.5 Interior Finish. Interior finish shall be Class A throughout in accordance with Section 10.2.

13.4.8 Grandstands.

13.4.8.1 General. Grandstands shall comply with the provisions of this chapter as modified by 13.4.8.

Exception: Existing grandstands shall be permitted to be continued to be used subject to the approval of the authority having jurisdiction.

13.4.8.2 Seating.

13.4.8.2.1 Where grandstand seating without backs is used indoors, rows of seats shall be spaced not less than 22 in. (55.9 cm) back-to-back.

13.4.8.2.2 The depth of footboards and seat boards in grandstands shall be not less than 9 in. (22.9 cm). Where the same level is not used for both seat foundations and footrests, footrests independent of seats shall be provided.

13.4.8.2.3 Seats and footrests of grandstands shall be supported securely and fastened in such a manner that they cannot be displaced inadvertently.

13.4.8.2.4 Individual seats or chairs shall be permitted only if secured firmly in rows in an approved manner, unless seats do not exceed 16 in number and are located on level floors and within railed-in enclosures, such as boxes.

13.4.8.3 Special Requirements — Wood Grandstands.

13.4.8.3.1 An outdoor wood grandstand shall be erected within not less than two-thirds of its height and, in no case, within not less than 10 ft (3 m) of a building.

Exception No. 1: The distance requirement shall not apply for buildings of not less than 1-hour fire resistance-rated construction with openings protected against the fire exposure hazard created by the grandstand.

Exception No. 2: The distance requirement shall not apply where a wall of not less than 1-hour fire resistance-rated construction separates such a grandstand from the building.

13.4.8.3.2 An outdoor wood grandstand unit shall not exceed 10,000 ft² (929 m²) in ground area or 200 ft (61 m) in length. Grandstand units of the maximum size shall be placed not less than 20 ft (6.1 m) apart or shall be separated by walls of 1-hour fire resistance rating. The number of such units erected in any

one group shall not exceed three. Each group shall be separated from any other group by a wall of 2-hour fire resistance-rated construction extending 2 ft (0.6 m) above the seat platforms or by an open space of not less than 50 ft (15.2 m).

Exception: Where entirely constructed of labeled fire-retardant-treated wood that has passed the standard rain test, ASTM D 2898, Test Method for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing, or where constructed of members conforming to dimensions for heavy timber construction (Type IV (2HH)), the ground area or length shall be permitted to be doubled.

13.4.8.3.3 The highest level of seat platforms above the ground or the surface at the front of the grandstand for any wood grandstand shall not exceed 20 ft (6.1 m). For portable grandstands within tents or membrane structures, the highest level shall not exceed 12 ft (3.7 m).

Exception: Where entirely constructed of labeled fire-retardant-treated wood that has passed the standard rain test, ASTM D 2898, Test Method for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing, or where constructed of members conforming to dimensions for heavy timber construction (Type IV (2HH)), the height shall be permitted to be doubled.

13.4.8.4 Special Requirements — Portable Grandstands.

13.4.8.4.1 Portable grandstands shall conform to the requirements of 13.4.8 for grandstands and the requirements of 13.4.8.4.2 and 13.4.8.4.3.

13.4.8.4.2 Portable grandstands shall be self-contained and shall have within them all necessary parts to withstand and restrain all forces that might be developed during human occupancy. They shall be designed and manufactured so that if any structural members essential to the strength and stability of the structure have been omitted during erection, the presence of unused connection fittings shall make the omissions self-evident. The construction shall be skillfully accomplished to produce the strength required by the design.

13.4.8.4.3 Portable grandstands shall be provided with base plates, sills, floor runners, or sleepers of such area that the permitted bearing capacity of the supporting material is not exceeded. Where portable grandstands rest directly on a base of such character that it is incapable of supporting the load without appreciable settlement, mud sills of suitable material, having sufficient area to prevent undue or dangerous settlement, shall be installed under base plates, runners, or sleepers. All bearing surfaces shall be in contact with each other.

13.4.8.5 Spaces Underneath Grandstands. Spaces underneath a grandstand shall be kept free of flammable or combustible materials, unless protected by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

Exception No. 1: This requirement shall not apply to accessory uses of 300 ft² (28 m²) or less in area where of noncombustible or fire-resistive construction, such as ticket booths, toilet facilities, or concession booths, in otherwise nonsprinklered facilities.

Exception No. 2: This requirement shall not apply to rooms enclosed in not less than 1-hour fire resistance-rated construction that are less than 1000 ft² (93 m²) in area in otherwise nonsprinklered facilities.

13.4.8.6 Guards and Railings.

13.4.8.6.1 Railings or guards not less than 42 in. (107 cm) above the aisle surface or footrest or not less than 36 in. (91 cm) vertically above the center of the seat or seat board surface, whichever is adjacent, shall be provided along those portions of

the backs and ends of all grandstands where the seats are in excess of 4 ft (1.2 m) above the floor or ground.

Exception: This requirement shall not apply where an adjacent wall or fence affords equivalent safeguard.

13.4.8.6.2 Where the front footrest of any grandstand is more than 2 ft (0.6 m) above the floor, railings or guards not less than 33 in. (84 cm) above such footrests shall be provided.

Exception: In grandstands, or where the front row of seats includes backrests, the rails shall be not less than 26 in. (66 cm) high.

13.4.8.6.3 Cross aisles located within the seating area shall be provided with rails not less than 26 in. (66 cm) high along the front edge of the cross aisle.

Exception: Where the backs of the seats in front of the cross aisle project 24 in. (61 cm) or more above the surface of the cross aisle, the rail shall not be required.

13.4.8.6.4 Vertical openings between guardrails and footboards or seat boards shall be provided with intermediate construction so that a 4-in. (10.2-cm) diameter sphere cannot pass through the opening.

13.4.8.6.5 An opening between the seat board and footboard located more than 30 in. (76 cm) above grade shall be provided with intermediate construction so that a 4-in. (10.2-cm) diameter sphere cannot pass through the opening.

13.4.9 Folding and Telescopic Seating.

13.4.9.1 General. Folding and telescopic seating shall comply with the provisions of this chapter as modified by 13.4.9.

Exception: Existing folding and telescopic seating shall be permitted to be continued to be used subject to the approval of the authority having jurisdiction.

13.4.9.2 Seating.

13.4.9.2.1 The horizontal distance of seats, measured back-to-back, shall be not less than 22 in. (55.9 cm) for seats without backs. There shall be a space of not less than 12 in. (30.5 cm) between the back of each seat and the front of each seat immediately behind it. If seats are of the chair type, the 12-in. (30.5-cm) dimension shall be measured to the front edge of the rear seat in its normal unoccupied position. All measurements shall be taken between plumb lines.

13.4.9.2.2 The depth of footboards (footrests) and seat boards in folding and telescopic seating shall be not less than 9 in. (22.9 cm). Where the same level is not used for both seat foundations and footrests, footrests independent of seats shall be provided.

13.4.9.2.3 Individual chair-type seats shall be permitted in folding and telescopic seating only if firmly secured in groups of not less than three.

13.4.9.3 Guards and Railings.

13.4.9.3.1 Railings or guards not less than 42 in. (107 cm) above the aisle surface or footrest or not less than 36 in. (91 cm) vertically above the center of the seat or seat board surface, whichever is adjacent, shall be provided along those portions of the backs and ends of all folding and telescopic seating where the seats are more than 4 ft (1.2 m) above the floor or ground.

Exception: This requirement shall not apply where an adjacent wall or fence affords equivalent safeguard.

13.4.9.3.2 Where the front footrest of folding or telescopic seating is more than 2 ft (0.6 m) above the floor, railings or guards not less than 33 in. (84 cm) above such footrests shall be provided.

Exception: Where the front row of seats includes backrests, the rails shall be not less than 26 in. (66 cm) high.

13.4.9.3.3 Cross aisles located within the seating area shall be provided with rails not less than 26 in. (66 cm) high along the front edge of the cross aisle.

Exception: Where the backs of the seats in front of the cross aisle project 24 in. (61 cm) or more above the surface of the cross aisle, the rail shall not be required.

13.4.9.3.4 Vertical openings between guardrails and footboards or seat boards shall be provided with intermediate construction so that a 4-in. (10.2-cm) diameter sphere cannot pass through the opening.

13.4.9.3.5 An opening between the seat board and footboard located more than 30 in. (76 cm) above grade shall be provided with intermediate construction so that a 4-in. (10.2-cm) diameter sphere cannot pass through the opening.

SECTION 13.5 BUILDING SERVICES

13.5.1 Utilities. Utilities shall comply with the provisions of Section 9.1.

13.5.2 Heating, Ventilating, and Air Conditioning Equipment. Heating, ventilating, and air conditioning equipment shall comply with the provisions of Section 9.2.

13.5.3 Elevators, Escalators, and Conveyors. Elevators, escalators, and conveyors shall comply with the provisions of Section 9.4.

13.5.4 Rubbish Chutes, Incinerators, and Laundry Chutes. Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 9.5.

SECTION 13.6 RESERVED

SECTION 13.7 OPERATING FEATURES

13.7.1 Special Provisions for Food Service Operations.

13.7.1.1 All devices in connection with the preparation of food shall be installed and operated to avoid hazard to the safety of occupants.

13.7.1.2 All devices in connection with the preparation of food shall be of an approved type and shall be installed in an approved manner.

13.7.1.3 Food preparation facilities shall be protected in accordance with 9.2.3 and shall not be required to have openings protected between food preparation areas and dining areas.

13.7.1.4 Portable Cooking Equipment. Portable cooking equipment that is not flue-connected shall be permitted only as follows:

- (1) Equipment fueled by small heat sources that can be readily extinguished by water, such as candles or alcohol-burning equipment, including solid alcohol, shall be permitted to be used, provided that precautions satisfactory to the authority having jurisdiction are taken to prevent ignition of any combustible materials.

- (2) Candles shall be permitted to be used on tables used for food service where securely supported on substantial noncombustible bases located to avoid danger of ignition of combustible materials and only where approved by the authority having jurisdiction.

- (3) Candle flames shall be protected.

- (4) "Flaming sword" or other equipment involving open flames and flamed dishes, such as cherries jubilee or crêpe suzette, shall be permitted to be used, provided that precautions subject to the approval of the authority having jurisdiction are taken.

- (5) *Listed and approved LP-Gas commercial food service appliances shall be permitted to be used where in accordance with NFPA 58, *Liquefied Petroleum Gas Code*.

13.7.2 Open Flame Devices and Pyrotechnics. No open flame devices or pyrotechnic device shall be used in any assembly occupancy.

Exception No. 1: Pyrotechnic special effect devices shall be permitted to be used on stages before proximate audiences for ceremonial or religious purposes, as part of a demonstration in exhibits, or as part of a performance, provided that precautions satisfactory to the authority having jurisdiction are taken to prevent ignition of any combustible material and use of the pyrotechnic device complies with NFPA 1126, Standard for the Use of Pyrotechnics before a Proximate Audience.

Exception No. 2: Flame effects before an audience shall be permitted in accordance with NFPA 160, Standard for Flame Effects Before an Audience.

Exception No. 3: Open flame devices shall be permitted to be used in the following situations, provided that precautions satisfactory to the authority having jurisdiction are taken to prevent ignition of any combustible material or injury to occupants:

(a)* *Where necessary for ceremonial or religious purposes*

(b) *On stages and platforms as a necessary part of a performance*

(c) *Where candles on tables are securely supported on substantial noncombustible bases and candle flame is protected*

Exception No. 4: This requirement shall not apply to heat-producing equipment complying with 9.2.2.

Exception No. 5: This requirement shall not apply to food service operations in accordance with 13.7.1.

Exception No. 6: Gas lights shall be permitted to be used, provided that precautions subject to the approval of authority having jurisdiction are taken to prevent ignition of any combustible materials.

13.7.3 Furnishings, Decorations, and Scenery.

13.7.3.1 Fabrics and films used for decorative purposes, all draperies and curtains, and similar furnishings shall be in accordance with the provisions of 10.3.1.

13.7.3.2 The authority having jurisdiction shall impose controls on the quantity and arrangement of combustible contents in assembly occupancies to provide an adequate level of safety to life from fire.

13.7.3.3* Exposed foamed plastic materials and unprotected materials containing foamed plastic used for decorative purposes or stage scenery shall have a heat release rate not exceeding 100 kW where tested in accordance with UL 1975, *Standard for Fire Tests for Foamed Plastics Used for Decorative Purposes*.

Exception: This requirement shall not apply to individual foamed plastic items or items containing foamed plastic where the foamed plastic does not exceed 1 lb (0.45 kg) in weight.

13.7.4 Special Provisions for Exposition Facilities.

13.7.4.1 No display or exhibit shall be installed or operated to interfere in any way with access to any required exit or with the visibility of any required exit or required exit sign; nor shall any display block access to fire-fighting equipment.

13.7.4.2 A storage room having an enclosure consisting of a smoke barrier having a fire resistance rating of 1 hour and protected by an automatic extinguishing system shall be provided for combustible materials not on display, including combustible packing crates used to ship exhibitors' supplies and products.

13.7.4.3 Exhibits.

13.7.4.3.1 Exhibits shall comply with 13.7.4.3.2 through 13.7.4.3.11.

13.7.4.3.2 The travel distance within the exhibit booth or exhibit enclosure to an exit access aisle shall not exceed 50 ft (15 m).

13.7.4.3.3 The upper deck of multilevel exhibits greater than 300 ft² (27.9 m²) shall have not less than two remote means of egress.

13.7.4.3.4 Exhibit booths shall be constructed of the following:

- (1) Noncombustible or limited-combustible materials
- (2) Wood exceeding 1/4 in. (0.6 cm) nominal thickness or wood not exceeding 1/4 in. (0.6 cm) nominal thickness that is pressure-treated, fire-retardant wood meeting the requirements of NFPA 703, *Standard for Fire Retardant Impregnated Wood and Fire Retardant Coatings for Building Materials*
- (3) *Flame-retardant materials complying with NFPA 701, *Standard Methods of Fire Tests for Flame Propagation of Textiles and Films*
- (4) Textile wall coverings, such as carpeting and similar products used as wall or ceiling finishes, complying with the provisions of 10.2.2 and 10.2.4
- (5) Plastics limited to those that comply with 12.3.3 and Section 10.2
- (6) Foamed plastics and materials containing foamed plastics having a heat release rate for any single fuel package that does not exceed 100 kW where tested in accordance with UL 1975, *Standard for Fire Tests for Foamed Plastics Used for Decorative Purposes*
- (7) Cardboard, honeycombed paper, and other combustible materials having a heat release rate for any single fuel package that does not exceed 150 kW where tested in accordance with UL 1975, *Standard for Fire Tests for Foamed Plastics Used for Decorative Purposes*

13.7.4.3.5 Curtains, drapes, and decorations shall comply with the applicable portions of 10.3.1.

13.7.4.3.6 Acoustical and decorative material including, but not limited to, cotton, hay, paper, straw, moss, split bamboo, and wood chips shall be flame-retardant treated to the satisfaction of the authority having jurisdiction. Materials that cannot be treated for flame retardancy shall not be used. Foamed plastics and materials containing foamed plastics used as decorative objects such as, but not limited to, mannequins, murals, and signs shall have a heat release rate for any single fuel package that does not exceed 150 kW where tested in accordance with UL 1975, *Standard for Fire Tests for Foamed Plastics Used for Decorative Purposes*.

Exception: Where the aggregate area of such materials is less than 10 percent of the individual floor or wall area, such materials shall be permitted to be used subject to the approval of the authority having jurisdiction.

13.7.4.3.7 The following shall be protected by automatic extinguishing systems:

- (1) Single-level exhibit booths exceeding 300 ft² (27.9 m²) and covered with a ceiling
- (2) Each level of multilevel exhibit booths, protected throughout, including the uppermost level where the uppermost level is covered with a ceiling

A single exhibit or group of exhibits with ceilings that do not require sprinklers shall be separated by a distance not less than 10 ft (3 m) where the aggregate ceiling exceeds 300 ft² (27.9 m²).

The water supply and piping for the sprinkler system shall be permitted to be of approved, temporary means that is provided by a domestic water supply, a standpipe system, or a sprinkler system.

Exception No. 1: Ceilings that are constructed of open grate design or listed dropout ceilings in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*, shall not be considered ceilings within the context of 13.7.4.3.7.

Exception No. 2: Vehicles, boats, and similar exhibited products having over 100 ft² (9.3 ft²) of roofed area shall be provided with smoke detectors acceptable to the authority having jurisdiction.

*Exception No. 3:** This requirement shall not apply where fire protection of multilevel exhibit booths is consistent with the criteria developed through a life safety evaluation of the exhibition hall in accordance with 13.4.1, subject to approval of the authority having jurisdiction.

13.7.4.3.8 Open flame devices within exhibit booths shall comply with 13.7.2.

13.7.4.3.9 Cooking and food-warming devices in exhibit booths shall comply with 13.7.1 and the following:

- (1) Gas-fired devices shall comply with the following:
 - a. Natural gas-fired devices shall be in accordance with 9.1.1.

Exception: The requirement of 13.7.4.3.9(1)a shall not apply to compressed natural gas where permitted by the authority having jurisdiction.

- b. The use of LP-Gas cylinders shall be prohibited.

Exception: Nonrefillable LP-Gas cylinders shall be permitted to be used where permitted by the authority having jurisdiction.

- (2) The devices shall be isolated from the public by not less than 4 ft (1.2 m) or by a barrier between the devices and the public.
- (3) Multi-well cooking equipment using combustible oils or solids shall comply with 9.2.3.
- (4) Single-well cooking equipment using combustible oils or solids shall meet the following criteria:
 - a. They shall have lids available for immediate use.
 - b. They shall be limited to 288 in.² (0.19 m²) of cooking surface.
 - c. They shall be placed on noncombustible surface materials.
 - d. They shall be separated from each other by a horizontal distance of not less than 2 ft (0.6 m).

Exception: The requirement of 13.7.4.3.9(4)d shall not apply to multiple single-well cooking equipment where the aggregate cooking surface area does not exceed 288 in.² (0.19 m²).

- e. They shall be kept at a horizontal distance of not less than 2 ft (0.6 m) from any combustible material.
- (5) A 20-B:C fire extinguisher shall be provided within the booth for each device, or an approved automatic extinguishing system shall be provided. (See 9.7.4.1.)

13.7.4.3.10 Combustible materials within exhibit booths shall be limited to a one-day supply. Storage of combustible materials behind the booth shall be prohibited. (See 13.7.3.2 and 13.7.4.2.)

13.7.4.3.11 Plans for the exposition, in an acceptable form, shall be submitted to the authority having jurisdiction for approval prior to setting up any exhibit. The plan shall show all details of the proposed exposition. No exposition shall occupy any exposition facility without approved plans.

13.7.4.4 Vehicles. Vehicles on display within an exposition facility shall comply with 13.7.4.4.1 through 13.7.4.4.5.

13.7.4.4.1 All fuel tank openings shall be locked and sealed in an approved manner to prevent the escape of vapors. Fuel tanks shall not contain in excess of one-half their capacity or contain in excess of 10 gal (37.9 L) of fuel, whichever is less.

13.7.4.4.2 At least one battery cable shall be removed from the batteries used to start the vehicle engine. The disconnected battery cable shall then be taped.

13.7.4.4.3 Batteries used to power auxiliary equipment shall be permitted to be kept in service.

13.7.4.4.4 Fueling or defueling of vehicles shall be prohibited.

13.7.4.4.5 Vehicles shall not be moved during exhibit hours.

13.7.4.5 Compressed flammable gases; flammable or combustible liquids; hazardous chemicals or materials; and Class II or greater lasers, blasting agents, and explosives shall be prohibited within exhibit halls.

Exception: The authority having jurisdiction shall be permitted to allow the limited use of any items specified in 13.7.4.5 under special circumstances.

13.7.4.6 Alternatives. (See Section 1.5.)

13.7.5* Crowd Managers. In assembly occupancies having occupant loads exceeding 1000, there shall be trained crowd managers or crowd manager supervisors at a ratio of 1 crowd manager/supervisor for every 250 occupants. The crowd manager shall receive approved training in crowd management techniques.

Exception No. 1: This requirement shall not apply to assembly occupancies used exclusively for religious worship with an occupant load not exceeding 2000.

Exception No. 2: Where, in the opinion of the authority having jurisdiction, the existence of an approved, supervised automatic sprinkler system and the nature of the event warrant, the ratio of trained crowd managers to occupants shall be permitted to be reduced.

13.7.6* Drills.

13.7.6.1 The employees or attendants of assembly occupancies shall be trained and drilled in the duties they are to perform in case of fire, panic, or other emergency to effect orderly exiting.

13.7.6.2 Employees or attendants of assembly occupancies shall be instructed in the proper use of portable fire extin-

guishers and other manual fire suppression equipment where provided.

13.7.6.3* In theaters, motion picture theaters, auditoriums, and other similar assembly occupancies with occupant loads exceeding 300 where there are noncontinuous programs, an audible announcement shall be made, or a projected image shall be shown, prior to the start of each program to notify occupants of the location of the exits to be used in case of a fire or other emergency.

Exception: This requirement shall not apply to assembly occupancies in schools where used for nonpublic events.

13.7.7 Smoking.

13.7.7.1 Smoking in assembly occupancies shall be regulated by the authority having jurisdiction.

13.7.7.2 In rooms or areas where smoking is prohibited, plainly visible signs shall be posted that read as follows:

NO SMOKING

13.7.7.3 No person shall smoke in prohibited areas that are so posted.

Exception: The authority having jurisdiction shall permit smoking on a stage only where it is a necessary and rehearsed part of a performance and only where the smoker is a regular performing member of the cast.

13.7.7.4 Where smoking is permitted, suitable ashtrays or receptacles shall be provided in convenient locations.

13.7.8 Seating.

13.7.8.1 Seats in assembly occupancies accommodating more than 200 persons shall be securely fastened to the floor, except where fastened together in groups of not less than three and not exceeding seven and as permitted by 13.7.8.2. All seats in balconies and galleries shall be securely fastened to the floor, except in places of religious worship.

13.7.8.2 Seats not secured to the floor shall be permitted in restaurants, night clubs, and other occupancies where fastening seats to the floor might be impracticable. Such unsecured seats shall be permitted, provided that, in the area used for seating, excluding such areas of dance floors and stages, there is not more than one seat for each 15 ft² (1.4 m²) of net floor area, and adequate aisles to reach exits are maintained at all times. Seating diagrams shall be submitted for approval by the authority having jurisdiction to permit an increase in occupant load per 7.3.1.3.

13.7.8.3 Every room constituting an assembly occupancy and not having fixed seats shall have the occupant load of the room posted in a conspicuous place near the main exit from the room. Approved signs shall be maintained in a legible manner by the owner or authorized agent. Signs shall be durable and shall indicate the number of occupants permitted for each room use.

13.7.9 Maintenance of Outdoor Grandstands. The owner shall provide for not less than annual inspection and required maintenance of each outdoor grandstand to ensure safe conditions. At least biennially, the inspection shall be performed by a professional engineer, registered architect, or individual certified by the manufacturer. Where required by the authority having jurisdiction, the owner shall provide certification that such inspection has been performed.

13.7.10 Maintenance and Operation of Folding and Telescopic Seating.

13.7.10.1 Instructions in both maintenance and operation shall be transmitted to the owner by the manufacturer of the seating or his or her representative.

13.7.10.2 Maintenance and operation of folding and telescopic seating shall be the responsibility of the owner or his or her duly authorized representative and shall include the following:

- (1) During operation of the folding and telescopic seats, the opening and closing shall be supervised by responsible personnel who shall ensure that the operation is in accordance with the manufacturer's instructions.
- (2) Only attachments specifically approved by the manufacturer for the specific installation shall be attached to the seating.

- (3) An annual inspection and required maintenance of each grandstand shall be performed to ensure safe conditions. At least biennially, the inspection shall be performed by a professional engineer, registered architect, or individual certified by the manufacturer.

13.7.11 Clothing. Clothing and personal effects shall not be stored in corridors.

Exception No. 1: This requirement shall not apply to corridors protected by an approved automatic sprinkler system in accordance with Section 9.7.

Exception No. 2: This requirement shall not apply to corridor areas protected by a smoke detection system in accordance with Section 9.6.

Exception No. 3: This requirement shall not apply to storage in metal lockers, provided that the required egress width is maintained.

Chapter 14 NEW EDUCATIONAL OCCUPANCIES

SECTION 14.1 GENERAL REQUIREMENTS

14.1.1 Application.

14.1.1.1 The requirements of this chapter apply to the following:

- (1) New buildings or portions thereof used as educational occupancies (*see 1.4.1*)
- (2) Additions made to, or used as, an educational occupancy (*see 4.6.6*)
- (3) Alterations, modernizations, or renovations of existing educational occupancies (*see 4.6.7*)
- (4) Existing buildings or portions thereof upon change of occupancy to an educational occupancy (*see 4.6.11*)

14.1.1.2 Educational facilities that do not meet the definition of an educational occupancy shall not be required to comply with this chapter but shall comply with the following requirements:

- (1) Instructional building — business occupancy
- (2) Classrooms under 50 persons — business occupancy
- (3) Classrooms, 50 persons and over — assembly occupancy
- (4) Laboratories, instructional — business occupancy
- (5) Laboratories, noninstructional — industrial

14.1.2 Mixed Occupancies. (*See also 14.1.4.*)

14.1.2.1 Where other types of occupancy exist in the same building as an educational occupancy, the requirements of 6.1.14 of this *Code* shall apply, unless otherwise specified in this chapter.

14.1.2.2 Assembly and Educational. Spaces subject to assembly occupancy shall comply with Chapter 12, including 12.1.2, which provides that where auditorium and gymnasium egress lead through corridors or stairways also serving as egress for other parts of the building, the egress capacity shall be sufficient to allow simultaneous egress from auditorium and classroom sections.

Exception: In the case of an assembly occupancy of a type suitable only for use by the school occupant load and, therefore, not subject to simultaneous occupancy, the same egress capacity shall be permitted to serve both sections.

14.1.2.3 Dormitory and Classrooms. Any building used for both classroom and dormitory purposes shall comply with the applicable provisions of Chapter 28 in addition to complying with Chapter 14. Where classroom and dormitory sections are not subject to simultaneous occupancy, the same egress capacity shall be permitted to serve both sections.

14.1.3 Special Definitions.

Common Atmosphere. See 3.3.31.

Flexible Plan and Open Plan Educational or Day-Care Building. See 3.3.80.

Separate Atmosphere. See 3.3.178.

14.1.4 Classification of Occupancy. (*See 6.1.3.*)

14.1.4.1 Educational occupancies shall include all buildings used for educational purposes through the twelfth grade by six or more persons for four or more hours per day or more than 12 hours per week.

14.1.4.2 Educational occupancies shall include part-day preschools, kindergartens, and other schools whose purpose is

primarily educational, even though the children who attend such schools are of preschool age.

14.1.4.3 In cases where instruction is incidental to some other occupancy, the section of this *Code* governing such other occupancy shall apply.

14.1.4.4 Other occupancies associated with educational institutions shall be in accordance with the appropriate parts of this *Code*. (*See Chapters 18, 20, 26, 28, 30, 40, and 42 and 6.1.14.*)

14.1.5 Classification of Hazard of Contents. The contents of educational occupancies shall be classified in accordance with the provisions of Section 6.2.

14.1.6 Minimum Construction Requirements. (No requirements.)

14.1.7 Occupant Load.

14.1.7.1 The occupant load, in number of persons for whom means of egress and other provisions are required, shall be determined on the basis of the occupant load factors of Table 7.3.1.2 that are characteristic of the use of the space or shall be determined as the maximum probable population of the space under consideration, whichever is greater.

14.1.7.2 The occupant load of an educational occupancy, or a portion thereof, shall be permitted to be modified from that specified in 14.1.7.1 if the necessary aisles and exits are provided. An approved aisle or seating diagram shall be required by the authority having jurisdiction to substantiate such a modification.

SECTION 14.2 MEANS OF EGRESS REQUIREMENTS

14.2.1 General.

14.2.1.1 Means of egress shall be in accordance with Chapter 7 and Section 14.2.

14.2.1.2 Rooms normally occupied by preschool, kindergarten, or first-grade students shall not be located above or below the level of exit discharge. Rooms normally occupied by second-grade students shall not be located more than one story above the level of exit discharge.

Exception: Rooms or areas located on floor levels other than as specified in 14.2.1.2 shall be permitted to be used where provided with independent means of egress dedicated for use by the preschool, kindergarten, first-grade, or second-grade students.

14.2.2 Means of Egress Components.

14.2.2.1 Components of means of egress shall be limited to the types described in 14.2.2.2 through 14.2.2.10.

14.2.2.2 Doors.

14.2.2.2.1 Doors complying with 7.2.1 shall be permitted.

14.2.2.2.2 Panic Hardware or Fire Exit Hardware. Any door in a required means of egress from an area having an occupant load of 100 or more persons 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.

14.2.2.2.3 Special locking arrangements complying with 7.2.1.6 shall be permitted.

14.2.2.3* Stairs. Stairs complying with 7.2.2 shall be permitted.

14.2.2.4 Smokeproof Enclosures. Smokeproof enclosures complying with 7.2.3 shall be permitted.

14.2.2.5 Horizontal Exits. Horizontal exits complying with 7.2.4 shall be permitted.

14.2.2.6 Ramps. Ramps complying with 7.2.5 shall be permitted.

14.2.2.7 Exit Passageways. Exit passageways complying with 7.2.6 shall be permitted.

14.2.2.8 Fire Escape Ladders. Fire escape ladders complying with 7.2.9 shall be permitted.

14.2.2.9 Alternating Tread Devices. Alternating tread devices complying with 7.2.11 shall be permitted.

14.2.2.10 Areas of Refuge. Areas of refuge complying with 7.2.12 shall be permitted.

14.2.3 Capacity of Means of Egress.

14.2.3.1 Capacity of means of egress shall be in accordance with Section 7.3.

14.2.3.2 Minimum Corridor Width. Exit access corridors shall have not less than 6 ft (1.8 m) of clear width.

14.2.4 Number of Exits. Not less than two separate exits shall be as follows:

- (1) Provided on every story
- (2) Accessible from every part of every story and mezzanine

14.2.5 Arrangement of Means of Egress. (See also Section 7.5.)

14.2.5.1 Means of egress shall be arranged in accordance with Section 7.5.

14.2.5.2 No dead-end corridor shall exceed 20 ft (6.1 m), other than in buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, in which case dead-end corridors shall not exceed 50 ft (15 m).

14.2.5.3 No common path of travel shall exceed 75 ft (23 m), other than for the first 100 ft (30 m) in a building protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

14.2.5.4 Every room that is normally subject to student occupancy shall have an exit access door leading directly to an exit access corridor or exit.

Exception No. 1: This requirement shall not apply where an exit door opens directly to the outside or to an exterior balcony or corridor as described in 14.2.5.7.

Exception No. 2: One room shall be permitted to intervene between a normally occupied student room and an exit access corridor, provided that all of the following criteria are met:

(a) *The travel from a room served by an intervening room to the corridor door or exit shall not exceed 75 ft (23 m).*

(b) *Clothing, personal effects, or other materials deemed hazardous by the authority having jurisdiction shall be stored in metal lockers, provided that they do not obstruct the exit access, or the intervening room shall be sprinklered in accordance with Section 9.7.*

(c) *One of the following means of protection shall be provided:*

- (1) *The intervening room shall have approved fire detection that activates the building alarm.*
- (2) *The building shall be protected by an approved, supervised automatic sprinkler system in accordance with Section 9.7.*

14.2.5.5 Doors that swing into an exit access corridor shall be arranged to prevent interference with corridor travel. (See also 7.2.1.4.4.)

14.2.5.6 Aisles. Aisles shall be not less than 30 in. (91 cm) wide. The space between parallel rows of seats shall not be subject to the minimum aisle width, provided that the number of seats that intervene between any seat and an aisle do not exceed six.

14.2.5.7* Exterior Corridors or Balconies. Exterior exit access shall comply with 7.5.3.

14.2.6 Travel Distance to Exits. Travel distance to an exit shall not exceed 150 ft (45 m) from any point in a building. (See also Section 7.6.)

Exception: Travel distance shall not exceed 200 ft (60 m) in educational occupancies protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

14.2.7 Discharge from Exits. Discharge from exits shall be arranged in accordance with Section 7.7.

14.2.8 Illumination of Means of Egress. Means of egress shall be illuminated in accordance with Section 7.8.

14.2.9 Emergency Lighting. Emergency lighting shall be provided in accordance with Section 7.9 in the following areas:

- (1) Interior stairs and corridors
- (2) Assembly use spaces
- (3) Flexible and open plan buildings
- (4) Interior or windowless portions of buildings
- (5) Shops and laboratories

14.2.10 Marking of Means of Egress. Means of egress shall have signs in accordance with Section 7.10.

14.2.11 Special Means of Egress Features.

14.2.11.1* Windows for Rescue. Every room or space greater than 250 ft² (23.2 m²) used for classroom or other educational purposes or normally subject to student occupancy shall have not less than one outside window for emergency rescue that complies with the following:

- (1) Such windows shall be openable from the inside without the use of tools and shall provide a clear opening of not less than 20 in. (51 cm) in width, 24 in. (61 cm) in height, and 5.7 ft² (0.53 m²) in area.
- (2) The bottom of the opening shall be not more than 44 in. (112 cm) above the floor, and any latching device shall be capable of being operated from not more than 54 in. (137 cm) above the finished floor.
- (3) The clear opening shall allow a rectangular solid, with a width and height that provides not less than the required 5.7-ft² (0.53-m²) opening and a depth of not less than 20 in. (51 cm), to pass fully through the opening.
- (4) Such windows shall be accessible by the fire department and shall open into an area having access to a public way.

Exception No. 1: This requirement shall not apply to buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

Exception No. 2: This requirement shall not apply where the room or space has a door leading directly to the outside of the building.

Exception No. 3: This requirement shall not apply to rooms located higher than three stories above grade.

SECTION 14.3 PROTECTION

14.3.1 Protection of Vertical Openings. Any vertical opening, other than unprotected vertical openings in accordance with 8.2.5.8, shall be enclosed or protected in accordance with 8.2.1. Where the provisions of 8.2.5.5 are used, the requirements of 14.3.5.2 shall be met.

14.3.2 Protection from Hazards.

14.3.2.1 Rooms or spaces for the storage, processing, or use of materials shall be protected in accordance with the following:

- (1) Separation from the remainder of the building by fire barriers having a fire resistance rating of not less than 1 hour or protection of such rooms by automatic extinguishing systems as specified in Section 8.4 in the following areas:
 - a. Boiler and furnace rooms

Exception: Boiler and furnace rooms shall be exempt from the requirement of 14.3.2.1(1)a where they enclose only air-handling equipment.

- b. Rooms or spaces used for the storage of combustible supplies in quantities deemed hazardous by the authority having jurisdiction
- c. Rooms or spaces used for the storage of hazardous materials or flammable or combustible liquids in quantities deemed hazardous by recognized standards
- d. Janitor closets

Exception: Janitor closets protected by automatic sprinklers shall be permitted to have doors with ventilating lowers.

- (2) Separation from the remainder of the building by fire barriers having a fire resistance rating of not less than 1 hour and protection of such rooms by automatic extinguishing systems as specified in Section 8.4 in the following areas:
 - a. Laundries
 - b. Maintenance shops, including woodworking and painting areas
 - c. Rooms or spaces used for processing or use of combustible supplies deemed hazardous by the authority having jurisdiction
 - d. Rooms or spaces used for processing or use of hazardous materials or flammable or combustible liquids in quantities deemed hazardous by recognized standards

- (3) Where automatic extinguishing is used to meet the requirements of 14.3.2.1(1) or (2), the protection shall be permitted in accordance with 9.7.1.2.

14.3.2.2 Food preparation facilities shall be protected in accordance with 9.2.3 and shall not be required to have openings protected between food preparation areas and dining areas.

14.3.2.3 Stages shall be protected in accordance with Chapter 12.

14.3.3 Interior Finish.

14.3.3.1 Interior finish shall be in accordance with Section 10.2.

14.3.3.2 Interior wall and ceiling finish materials in accordance with 10.2.3 shall be permitted as follows:

- (1) Exits — Class A
- (2) Other than exits — Class A or Class B

Exception: Low-height partitions not exceeding 5 ft (1.5 m) used in locations other than exits shall be permitted to be Class A, Class B, or Class C.

14.3.3.3 Interior Floor Finish. (No requirements.)

14.3.4 Detection, Alarm, and Communications Systems.

14.3.4.1 General. Educational occupancies shall be provided with a fire alarm system in accordance with Section 9.6.

Exception: This requirement shall not apply to buildings with an area not exceeding 1000 ft² (93 m²) that contains a single classroom and is located not less than 50 ft (15.2 m) from another building.

14.3.4.2 Initiation.

14.3.4.2.1 Initiation of the required fire alarm system, other than as permitted by 14.3.4.2.3, shall be by manual means in accordance with 9.6.2.1(1).

14.3.4.2.2 In buildings provided with automatic sprinkler protection, the operation of the sprinkler system shall automatically activate the fire alarm system in addition to the initiation means required in 14.3.4.2.1.

14.3.4.2.3 Alternative Protection System. Manual fire alarm boxes shall be permitted to be omitted where all of the following conditions are met:

- (1) Interior corridors are protected by smoke detectors using an alarm verification system as described in NFPA 72, *National Fire Alarm Code*.
- (2) Spaces such as auditoriums, cafeterias, and gymnasiums are protected by heat or other approved detection devices.
- (3) Shops and laboratories involving dusts or vapors are protected by heat or other approved detection devices.
- (4) Fire alarm signals are automatically transmitted to the public fire department in accordance with 9.6.4.
- (5) Provision is made at a central point to manually activate the evacuation signal or to evacuate only affected areas.

14.3.4.3 Notification.

14.3.4.3.1 Occupant Notification.

14.3.4.3.1.1 Occupant notification shall be accomplished automatically in accordance with 9.6.3. Positive alarm sequence shall be permitted in accordance with 9.6.3.4.

14.3.4.3.1.2 Where acceptable to the authority having jurisdiction, the fire alarm system shall be permitted to be used for other emergency signaling or for class changes, provided that the fire alarm is distinctive in signal and overrides all other use.

14.3.4.3.1.3 In order to prevent students from being returned to a building that is burning, the recall signal shall be separate and distinct from any other signals. Such signal shall be permitted to be given by use of distinctively colored flags or banners. If the recall signal is electric, the push buttons or other controls shall be kept under lock. The key for such lock shall be in the possession of the principal or another designated person in order to prevent a recall at a time when there is an actual fire. Regardless of the method of recall, the means of giving the signal shall be kept under lock.

14.3.4.3.2 Emergency Forces Notification. Fire department notification shall be accomplished in accordance with 9.6.4.

14.3.5 Extinguishment Requirements.

14.3.5.1 Every portion of educational buildings below the level of exit discharge shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

14.3.5.2 Buildings with unprotected openings in accordance with 8.2.5.5 shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

14.3.6 Corridors. Corridors shall be separated from other parts of the story by walls having a 1-hour fire resistance rating in accordance with 8.2.3.

Exception No. 1: Corridor protection shall not be required where all spaces normally subject to student occupancy have not less than one door opening directly to the outside or to an exterior exit access balcony or corridor in accordance with 7.5.3.

Exception No. 2: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, corridor walls shall not be required to be rated, provided that such walls form smoke partitions in accordance with 8.2.4.

Exception No. 3: Where the corridor ceiling is an assembly having a 1-hour fire resistance rating where tested as a wall, the corridor walls shall be permitted to terminate at the corridor ceiling.

Exception No. 4: Lavatories shall not be required to be separated from corridors, provided that they are separated from all other spaces by walls having not less than a 1-hour fire resistance rating in accordance with 8.2.3.

14.3.7 Subdivision of Building Spaces.

14.3.7.1 School buildings shall be subdivided into compartments by smoke barriers having a 1-hour fire resistance rating and complying with Section 8.3 where one or both of the following conditions exist:

- (1) The maximum area of a compartment, including the aggregate area of all floors having a common atmosphere, exceeds 30,000 ft² (2800 m²).
- (2) The length or width of the building exceeds 300 ft (91 m).

Exception No. 1: This requirement shall not apply where all spaces normally subject to student occupancy have not less than one door opening directly to the outside or to an exterior or exit access balcony or corridor in accordance with 7.5.3.

Exception No. 2: This requirement shall not apply to buildings that consist of only one story and are protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

14.3.7.2 The area of a smoke compartment shall not exceed 30,000 ft² (2800 m²), with no dimension exceeding 300 ft (91 m).

Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, there shall be no limitation on smoke compartment size, provided that the floor is divided into not less than two smoke compartments.

SECTION 14.4 SPECIAL PROVISIONS

14.4.1 Windowless Buildings and Underground Buildings. Windowless buildings and underground buildings shall comply with Section 11.7.

14.4.2 High-Rise Buildings. High-rise buildings shall comply with Section 11.8.

14.4.3 Flexible Plan and Open Plan Buildings.

14.4.3.1 Flexible plan and open plan buildings shall comply with the requirements of this chapter as modified by 14.4.3.2 through 14.4.3.4.

14.4.3.2 Each room occupied by more than 300 persons shall have two or more means of egress entering into separate atmospheres. Where three or more means of egress are required, the number of means of egress permitted to enter into the same atmosphere shall not exceed two.

14.4.3.3 Flexible plan schools shall be permitted to have walls and partitions rearranged periodically only if revised plans or diagrams have been approved by the authority having jurisdiction.

14.4.3.4 Flexible plan buildings shall be evaluated while all folding walls are extended and in use as well as when they are in the retracted position.

SECTION 14.5 BUILDING SERVICES

14.5.1 Utilities. Utilities shall comply with the provisions of Section 9.1.

14.5.2 Heating, Ventilating, and Air Conditioning Equipment.

14.5.2.1 Heating, ventilating, and air conditioning equipment shall comply with the provisions of Section 9.2.

14.5.2.2 Unvented fuel-fired heating equipment, other than gas space heaters in compliance with NFPA 54, *National Fuel Gas Code*, shall be prohibited.

14.5.3 Elevators, Escalators, and Conveyors. Elevators, escalators, and conveyors shall comply with the provisions of Section 9.4.

14.5.4 Rubbish Chutes, Incinerators, and Laundry Chutes. Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 9.5.

SECTION 14.6 RESERVED

SECTION 14.7 OPERATING FEATURES

14.7.1 Emergency Egress and Relocation Drills.

14.7.1.1* Emergency egress and relocation drills shall be conducted in accordance with Section 4.7 and the applicable provisions of 14.7.1.2.

14.7.1.2 Emergency egress and relocation drills shall be conducted as follows:

- (1) Not less than one emergency egress and relocation drill shall be conducted every month the facility is in session.

Exception: In climates where the weather is severe, the monthly emergency egress and relocation drills shall be permitted to be deferred, provided that the required number of emergency egress and relocation drills is achieved and not less than four are conducted before the drills are deferred.

- (2) All occupants of the building shall participate in the drill.
- (3) One additional emergency egress and relocation drill, other than for educational occupancies that are open on a year-round basis, shall be required within the first 30 days of operation.

14.7.1.3 All emergency and relocation drill alarms shall be sounded on the fire alarm system.

14.7.2 Inspection.

14.7.2.1* It shall be the duty of principals and teachers to inspect all exit facilities daily to ensure that all stairways, doors, and other exits are in proper condition.

14.7.2.2 Open plan buildings shall require extra surveillance to ensure that exit paths are maintained clear of obstruction and are obvious.

14.7.3 Furnishings and Decorations.

14.7.3.1 Draperies, curtains, and other similar furnishings and decorations in educational occupancies shall be in accordance with the provisions of 10.3.1.

14.7.3.2 Clothing and personal effects shall not be stored in corridors.

Exception No. 1: This requirement shall not apply to corridors protected by an automatic sprinkler system in accordance with Section 9.7.

Exception No. 2: This requirement shall not apply to corridor areas protected by a smoke detection system in accordance with Section 9.6.

Exception No. 3: This requirement shall not apply to storage in metal lockers, provided that the required egress width is maintained.

14.7.3.3 Artwork and teaching materials shall be permitted to be attached directly to the walls and shall not exceed 20 percent of the wall area.

Chapter 15 EXISTING EDUCATIONAL OCCUPANCIES

SECTION 15.1 GENERAL REQUIREMENTS

15.1.1 Application.

15.1.1.1 The requirements of this chapter apply to existing buildings or portions thereof currently occupied as educational occupancies. (See also 14.1.1.)

15.1.1.2 Educational facilities that do not meet the definition of an educational occupancy shall not be required to comply with this chapter but shall comply with the following requirements:

- (1) Instructional building — business occupancy
- (2) Classrooms under 50 persons — business occupancy
- (3) Classrooms, 50 persons and over — assembly occupancy
- (4) Laboratories, instructional — business occupancy
- (5) Laboratories, noninstructional — industrial

15.1.2 Mixed Occupancies. (See also 15.1.4.)

15.1.2.1 Where other types of occupancy exist in the same building as an educational occupancy, the requirements of 6.1.14 of this Code shall apply, unless otherwise specified in this chapter.

15.1.2.2 Assembly and Educational. Spaces subject to assembly occupancy shall comply with Chapter 13, including 13.1.2, which provides that where auditorium and gymnasium egress lead through corridors or stairways also serving as egress for other parts of the building, the egress capacity shall be sufficient to allow simultaneous egress from auditorium and classroom sections.

Exception: In the case of an assembly occupancy of a type suitable only for use by the school occupant load and, therefore, not subject to simultaneous occupancy, the same egress capacity shall be permitted to serve both sections.

15.1.2.3 Dormitory and Classrooms. Any building used for both classroom and dormitory purposes shall comply with the applicable provisions of Chapter 29 in addition to complying with Chapter 15. Where classroom and dormitory sections are not subject to simultaneous occupancy, the same egress capacity shall be permitted to serve both sections.

15.1.3 Special Definitions.

Common Atmosphere. See 3.3.31.

Flexible Plan and Open Plan Educational or Day-Care Building. See 3.3.80.

Separate Atmosphere. See 3.3.178.

15.1.4 Classification of Occupancy. (See 6.1.3.)

15.1.4.1 Educational occupancies shall include all buildings used for educational purposes through the twelfth grade by six or more persons for four or more hours per day or more than 12 hours per week.

15.1.4.2 Educational occupancies shall include part-day preschools, kindergartens, and other schools whose purpose is primarily educational, even though the children who attend such schools are of preschool age.

15.1.4.3 In cases where instruction is incidental to some other occupancy, the section of this Code governing such other occupancy shall apply.

15.1.4.4 Other occupancies associated with educational institutions shall be in accordance with the appropriate parts of this Code. (See Chapters 19, 21, 26, 29, 31, 40, and 42 and 6.1.14.)

15.1.5 Classification of Hazard of Contents. The contents of educational occupancies shall be classified in accordance with the provisions of Section 6.2.

15.1.6 Minimum Construction Requirements. (No requirements.)

15.1.7 Occupant Load.

15.1.7.1 The occupant load, in number of persons for whom means of egress and other provisions are required, shall be determined on the basis of the occupant load factors of Table 7.3.1.2 that are characteristic of the use of the space or shall be determined as the maximum probable population of the space under consideration, whichever is greater.

15.1.7.2 The occupant load of an educational occupancy, or a portion thereof, shall be permitted to be modified from that specified in 15.1.7.1 if the necessary aisles and exits are provided. An approved aisle or seating diagram shall be required by the authority having jurisdiction to substantiate such a modification.

SECTION 15.2 MEANS OF EGRESS REQUIREMENTS

15.2.1 General.

15.2.1.1 Means of egress shall be in accordance with Chapter 7 and Section 15.2.

15.2.1.2 Rooms normally occupied by preschool, kindergarten, or first-grade students shall not be located above or below the level of exit discharge. Rooms normally occupied by second-grade students shall not be located more than one story above the level of exit discharge.

Exception: Rooms or areas located on floor levels other than as specified in 15.2.1.2 shall be permitted to be used where provided with independent means of egress dedicated for use by the preschool, kindergarten, first-grade, or second-grade students.

15.2.2 Means of Egress Components.

15.2.2.1 Components of means of egress shall be limited to the types described in 15.2.2.2 through 15.2.2.10.

15.2.2.2 Doors.

15.2.2.2.1 Doors complying with 7.2.1 shall be permitted.

15.2.2.2.2 Panic Hardware or Fire Exit Hardware. Any required exit door subject to use by 100 or more persons 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.

15.2.2.2.3 Special locking arrangements complying with 7.2.1.6 shall be permitted.

15.2.2.3* Stairs.

15.2.2.3.1 Stairs complying with 7.2.2 shall be permitted.

15.2.2.3.2 Existing Class A stairs shall be permitted.

15.2.2.3.3 Existing Class B stairs shall be permitted where not used for student access.

15.2.2.4 Smokeproof Enclosures. Smokeproof enclosures complying with 7.2.3 shall be permitted.

15.2.2.5 Horizontal Exits. Horizontal exits complying with 7.2.4 shall be permitted.

15.2.2.6 Ramps. Ramps complying with 7.2.5 shall be permitted.

15.2.2.7 Exit Passageways. Exit passageways complying with 7.2.6 shall be permitted.

15.2.2.8 Fire Escape Ladders. Fire escape ladders complying with 7.2.9 shall be permitted.

15.2.2.9 Alternating Tread Devices. Alternating tread devices complying with 7.2.11 shall be permitted.

15.2.2.10 Areas of Refuge. Areas of refuge complying with 7.2.12 shall be permitted.

15.2.3 Capacity of Means of Egress.

15.2.3.1 Capacity of means of egress shall be in accordance with Section 7.3.

15.2.3.2 Minimum Corridor Width. Exit access corridors shall have not less than 6 ft (1.8 m) of clear width.

15.2.4 Number of Exits. Not less than two separate exits shall be as follows:

- (1) Provided on every story
- (2) Accessible from every part of every story and mezzanine

15.2.5 Arrangement of Means of Egress. (See also Section 7.5.)

15.2.5.1 Means of egress shall be arranged in accordance with Section 7.5.

15.2.5.2 No dead-end corridor shall exceed 20 ft (6.1 m), other than in buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, in which case dead-end corridors shall not exceed 50 ft (15 m).

15.2.5.3 No common path of travel shall exceed 75 ft (23 m), other than for the first 100 ft (30 m) in a building protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

15.2.5.4 Every room that is normally subject to student occupancy shall have an exit access door leading directly to an exit access corridor or exit.

Exception No. 1: This requirement shall not apply where an exit door opens directly to the outside or to an exterior balcony or corridor as described in 15.2.5.7.

Exception No. 2: One room shall be permitted to intervene between a normally occupied student room and an exit access corridor, provided that all of the following criteria are met:

(a) The travel from a room served by an intervening room to the corridor door or exit shall not exceed 75 ft (23 m).

(b) Clothing, personal effects, or other materials deemed hazardous by the authority having jurisdiction shall be stored in metal lockers, provided that they do not obstruct the exit access, or the intervening room shall be sprinklered in accordance with Section 9.7.

(c) One of the following means of protection shall be provided:

- (1) The intervening room shall have approved fire detection that activates the building alarm.*
- (2) The building shall be protected by an approved automatic sprinkler system in accordance with Section 7.7.*

Exception No. 3: Previously approved arrangements shall be permitted to continue to be used with the approval of the authority having jurisdiction.

15.2.5.5 Doors that swing into an exit access corridor shall be arranged to prevent interference with corridor travel. (See also 7.2.1.4.4.)

15.2.5.6 Aisles. Aisles shall be not less than 30 in. (91 cm) wide. The space between parallel rows of seats shall not be subject to the minimum aisle width, provided that the number of seats that intervene between any seat and an aisle do not exceed six.

15.2.5.7* Exterior Corridors or Balconies. Exterior exit access shall comply with 5.5.3.

15.2.6 Travel Distance to Exits. Travel distance to an exit shall not exceed 150 ft (45 m) from any point in a building. (See also Section 7.6.)

Exception No. 1: Travel distance shall not exceed 200 ft (60 m) in educational occupancies protected throughout by an approved automatic sprinkler system in accordance with Section 9.7.

Exception No. 2: Previously approved travel distances shall be permitted to continue to be used with the approval of the authority having jurisdiction.

15.2.7 Discharge from Exits. Discharge from exits shall be arranged in accordance with Section 7.7.

15.2.8 Illumination of Means of Egress. Means of egress shall be illuminated in accordance with Section 7.8.

15.2.9 Emergency Lighting. Emergency lighting shall be provided in accordance with Section 7.9 in the following areas:

- (1) Interior stairs and corridors
- (2) Assembly use spaces
- (3) Flexible and open plan buildings
- (4) Interior or windowless portions of buildings
- (5) Shops and laboratories

15.2.10 Marking of Means of Egress. Means of egress shall have signs in accordance with Section 7.10.

15.2.11 Special Means of Egress Features.

15.2.11.1* Windows for Rescue. Every room or space greater than 250 ft² (23.2 m²) used for classroom or other educational purposes or normally subject to student occupancy shall have not less than one outside window for emergency rescue that complies with the following:

- (1) Such windows shall be openable from the inside without the use of tools and shall provide a clear opening of not less than 20 in. (51 cm) in width, 24 in. (61 cm) in height, and 5.7 ft² (0.53 m²) in area.
- (2) The bottom of the opening shall be not more than 44 in. (112 cm) above the floor, and any latching device shall be capable of being operated from not more than 54 in. (137 cm) above the finished floor.
- (3) The clear opening shall allow a rectangular solid, with a width and height that provides not less than the required 5.7-ft² (0.53-m²) opening and a depth of not less than 20 in. (51 cm), to pass fully through the opening.

Exception No. 1: This requirement shall not apply to buildings protected throughout by an approved automatic sprinkler system in accordance with Section 9.7.

Exception No. 2: This requirement shall not apply where the room or space has a door leading directly to the outside of the building.

Exception No. 3: This requirement shall not apply to rooms located higher than three stories above grade.

Exception No. 4: Awning-type or hopper-type windows that are hinged or subdivided to provide a clear opening not less than 600 in.² (3900 cm²) in area, nor any dimension less than 22 in. (55.9 cm), shall be permitted to continue to be used. Screen walls or devices in front of required windows shall not interfere with rescue requirements.

Exception No. 5: This requirement shall not apply where the room or space complies with the following:

(a) Doors shall exist that allow travel between adjacent classrooms. Where such doors are used to travel from classroom to classroom, they shall provide direct access to exits in both directions or direct access to an exit in one direction and to a separate smoke compartment that provides access to another exit in the other direction.

(b) The corridor shall be separated from the classrooms by a wall that resists the passage of smoke, and all doors between the classrooms and the corridor shall be self-closing or automatic-closing in accordance with 7.2.1.8.

(c) The length of travel to exits along such paths shall not exceed 150 ft (45 m).

(d) Each communicating door shall be marked in accordance with Section 7.10.

(e) No locking device shall be permitted on the communicating doors.

SECTION 15.3 PROTECTION

15.3.1 Protection of Vertical Openings. Any vertical opening, other than unprotected vertical openings in accordance with 8.2.5.8, shall be enclosed or protected in accordance with 8.2.5. Where the provisions of 8.2.5.5 are used, the requirements of 15.3.5.2 shall be met.

Exception: Stairway enclosures shall not be required under the following conditions:

(a) Where a stairway serves only one adjacent floor, other than a basement

(b) Where a stairway is not connected with stairways serving other floors

(c) Where a stairway is not connected with corridors serving other than the two floors involved

15.3.2 Protection from Hazards.

15.3.2.1 Rooms or spaces for the storage, processing, or use of materials shall be protected in accordance with the following:

(1) Separation from the remainder of the building by fire barriers having a fire resistance rating of not less than 1 hour or protection of such rooms by automatic extinguishing systems as specified in Section 8.4 in the following areas:

a. Boiler and furnace rooms

Exception: Boiler and furnace rooms shall be exempt from the requirement of 15.3.2.1(1)a where they enclose only air-handling equipment.

b. Rooms or spaces used for the storage of combustible supplies in quantities deemed hazardous by the authority having jurisdiction

c. Rooms or spaces used for the storage of hazardous materials or flammable or combustible liquids in quantities deemed hazardous by recognized standards

d. Janitor closets

Exception: Janitor closets protected by automatic sprinklers shall be permitted to have doors with ventilating louvers.

(2) Separation from the remainder of the building by fire barriers having a fire resistance rating of not less than 1 hour and protection of such rooms by automatic extinguishing systems as specified in Section 8.4 in the following areas:

a. Laundries

b. Maintenance shops, including woodworking and painting areas

c. Rooms or spaces used for processing or use of combustible supplies deemed hazardous by the authority having jurisdiction

d. Rooms or spaces used for processing or use of hazardous materials or flammable or combustible liquids in quantities deemed hazardous by recognized standards

(3) Where automatic extinguishing is used to meet the requirements of 15.3.2.1(1) or (2), the protection shall be permitted in accordance with 9.7.1.2.

15.3.2.2 Food preparation facilities shall be protected in accordance with 9.2.3 and shall not be required to have openings protected between food preparation areas and dining areas.

15.3.2.3 Stages shall be protected in accordance with Chapter 13.

15.3.3 Interior Finish.

15.3.3.1 Interior finish shall be in accordance with Section 10.2.

15.3.3.2 Interior wall and ceiling finish materials in accordance with 10.2.3 shall be permitted as follows:

(1) Exits — Class A

(2) Corridors and lobbies — Class A or Class B

Exception: Low-height partitions not exceeding 5 ft (1.5 m) used in locations other than exits shall be permitted to be Class A, Class B, or Class C.

(3) All other locations — Class A, Class B, or Class C

15.3.3.3 Interior Floor Finish. (No requirements.)

15.3.4 Detection, Alarm, and Communications Systems.

15.3.4.1 General. Educational occupancies shall be provided with a fire alarm system in accordance with Section 9.6.

Exception: This requirement shall not apply to buildings with an area not exceeding 1000 ft² (93 m²) that contains a single classroom and is located not less than 50 ft (15.2 m) from another building.

15.3.4.2 Initiation.

15.3.4.2.1 Initiation of the required fire alarm system, other than as permitted by 15.3.4.2.3, shall be by manual means in accordance with 9.6.2.1(1).

Exception: In buildings where all normally occupied spaces are provided with a two-way communication system between such spaces and a constantly attended receiving station from where a general evacuation alarm can be sounded, the manual fire alarm boxes shall not be required, except in locations specifically designated by the authority having jurisdiction.

15.3.4.2.2 In buildings provided with automatic sprinkler protection, the operation of the sprinkler system shall automatically activate the fire alarm system in addition to the initiation means required in 15.3.4.2.1.

15.3.4.2.3 Alternative Protection System. Manual fire alarm boxes shall be permitted to be omitted where all of the following conditions are met:

- (1) Interior corridors are protected by smoke detectors using an alarm verification system as described in NFPA 72, *National Fire Alarm Code*.
- (2) Spaces such as auditoriums, cafeterias, and gymnasiums are protected by heat or other approved detection devices.
- (3) Shops and laboratories involving dusts or vapors are protected by heat or other approved detection devices.
- (4) Fire alarm signals are automatically transmitted to the public fire department in accordance with 9.6.4.
- (5) Provision is made at a central point to manually activate the evacuation signal or to evacuate only affected areas.

15.3.4.3 Notification.

15.3.4.3.1 Occupant Notification.

15.3.4.3.1.1 Occupant notification shall be accomplished automatically in accordance with 9.6.3. Positive alarm sequence shall be permitted in accordance with 9.6.3.4.

15.3.4.3.1.2 Where acceptable to the authority having jurisdiction, the fire alarm system shall be permitted to be used for other emergency signaling or for class changes, provided that the fire alarm is distinctive in signal and overrides all other use.

15.3.4.3.1.3 In order to prevent students from being returned to a building that is burning, the recall signal shall be separate and distinct from any other signals. Such signal shall be permitted to be given by use of distinctively colored flags or banners. If the recall signal is electric, the push buttons or other controls shall be kept under lock. The key for such lock shall be in the possession of the principal or another designated person in order to prevent a recall at a time when there is an actual fire. Regardless of the method of recall, the means of giving the signal shall be kept under lock.

15.3.4.3.2 Emergency Forces Notification. Wherever any of the school authorities determine that an actual fire exists, they shall immediately call the local fire department using the public fire alarm system or other available facilities.

15.3.5 Extinguishment Requirements.

15.3.5.1 Wherever student occupancy exists below the level of exit discharge, every portion of such floor shall be protected throughout by an approved automatic sprinkler system in accordance with Section 9.7. Where student occupancy does not exist on floors below the level of exit discharge, such floors shall be separated from the rest of the building by 1-hour fire resistance-rated construction or shall be protected throughout by an approved automatic sprinkler system in accordance with Section 9.7.

Exception: Where student occupancy exists below the level of exit discharge, automatic sprinkler protection shall not be required, subject to the approval of the authority having jurisdiction, where windows for rescue and ventilation are provided in accordance with 15.2.11.1.

15.3.5.2 Buildings with unprotected openings in accordance with 8.2.5.5 shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

15.3.6 Corridors. Corridors shall be separated from other parts of the story by walls having a $1/2$ -hour fire resistance rating in accordance with 8.2.3.

Exception No. 1: Corridor protection shall not be required where all spaces normally subject to student occupancy have not less than one door opening directly to the outside or to an exterior exit access balcony or corridor in accordance with 7.5.3.

Exception No. 2: In buildings protected throughout by an approved automatic sprinkler system with valve supervision in accordance with Section 9.7, corridor walls shall not be required to be rated, provided that such walls form smoke partitions in accordance with 8.2.4.*

Exception No. 3: Where the corridor ceiling is an assembly having a $1/2$ -hour fire resistance rating where tested as a wall, the corridor wall shall be permitted to terminate at the corridor ceiling.

Exception No. 4: Lavatories shall not be required to be separated from corridors, provided that they are separated from all other spaces by walls having not less than a $1/2$ -hour fire resistance rating in accordance with 8.2.3.

Exception No. 5: Existing doors in $1/2$ -hour fire resistance-rated corridor walls shall be permitted to be $1^{3/4}$ -in. (4.4-cm) thick solid-bonded wood core doors or the equivalent.

15.3.7 Subdivision of Building Spaces.

15.3.7.1 School buildings shall be subdivided into compartments by smoke barriers complying with Section 8.3 where one or both of the following conditions exist:

- (1) The maximum area of a compartment, including the aggregate area of all floors having a common atmosphere, exceeds 30,000 ft² (2800 m²).
- (2) The length or width of the building exceeds 300 ft (91 m).

Exception No. 1: This requirement shall not apply where all classrooms have exterior exit access in accordance with 7.5.3.

Exception No. 2: This requirement shall not apply to buildings protected throughout by an approved automatic sprinkler system in accordance with Section 9.7.

15.3.7.2 The area of a smoke compartment shall not exceed 30,000 ft² (2800 m²), with no dimension exceeding 300 ft (91 m).

15.3.7.3 Doors in smoke barriers shall be self-latching.

SECTION 15.4 SPECIAL PROVISIONS

15.4.1 Windowless Buildings and Underground Buildings. Windowless buildings and underground buildings shall comply with Section 11.7.

15.4.2 High-Rise Buildings. High-rise buildings shall comply with 11.8.2.1.

15.4.3 Flexible Plan and Open Plan Buildings.

15.4.3.1 Flexible plan and open plan buildings shall comply with the requirements of this chapter as modified by 15.4.3.2 through 15.4.3.4.

15.4.3.2 Each room occupied by more than 300 persons shall have two or more means of egress entering into separate atmospheres. Where three or more means of egress are required, the number of means of egress permitted to enter into the same atmosphere shall not exceed two.

15.4.3.3 Flexible plan schools shall be permitted to have walls and partitions rearranged periodically only if revised plans or diagrams have been approved by the authority having jurisdiction.

15.4.3.4 Flexible plan buildings shall be evaluated while all folding walls are extended and in use as well as when they are in the retracted position.

SECTION 15.5 BUILDING SERVICES

15.5.1 Utilities. Utilities shall comply with the provisions of Section 9.1.

15.5.2 Heating, Ventilating, and Air Conditioning Equipment.

15.5.2.1 Heating, ventilating, and air conditioning equipment shall comply with the provisions of Section 9.2.

15.5.2.2 Unvented fuel-fired heating equipment, other than gas space heaters in compliance with NFPA 54, *National Fuel Gas Code*, shall be prohibited.

15.5.3 Elevators, Escalators, and Conveyors. Elevators, escalators, and conveyors shall comply with the provisions of Section 9.4.

15.5.4 Rubbish Chutes, Incinerators, and Laundry Chutes. Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 9.5.

SECTION 15.6 RESERVED

SECTION 15.7 OPERATING FEATURES

15.7.1 Emergency Egress and Relocation Drills.

15.7.1.1* Emergency egress and relocation drills shall be conducted in accordance with Section 4.7 and the applicable provisions of 15.7.1.2.

15.7.1.2 Emergency egress and relocation drills shall be conducted as follows:

- (1) Not less than one emergency egress and relocation drill shall be conducted every month the facility is in session.

Exception: In climates where the weather is severe, the monthly emergency egress and relocation drills shall be permitted to be deferred, provided that the required number of emergency egress and relocation drills is achieved and not less than four are conducted before the drills are deferred.

- (2) All occupants of the building shall participate in the drill.
- (3) One additional emergency egress and relocation drill, other than for educational occupancies that are open on a year-round basis, shall be required within the first 30 days of operation.

15.7.1.3 All emergency and relocation drill alarms shall be sounded on the fire alarm system.

15.7.2 Inspection.

15.7.2.1* It shall be the duty of principals and teachers to inspect all exit facilities daily to ensure that all stairways, doors, and other exits are in proper condition.

15.7.2.2 Open plan buildings shall require extra surveillance to ensure that exit paths are maintained clear of obstruction and are obvious.

15.7.3 Furnishings and Decorations.

15.7.3.1 Draperies, curtains, and other similar furnishings and decorations in educational occupancies shall be in accordance with the provisions of 10.3.1.

15.7.3.2 Clothing and personal effects shall not be stored in corridors.

Exception No. 1: This requirement shall not apply to corridors protected by an automatic sprinkler system in accordance with Section 9.7.

Exception No. 2: This requirement shall not apply to corridor areas protected by a smoke detection system in accordance with Section 9.6.

Exception No. 3: This requirement shall not apply to storage in metal lockers, provided that the required egress width is maintained.

15.7.3.3 Artwork and teaching materials shall be permitted to be attached directly to the walls and shall not exceed 20 percent of the wall area.

Chapter 16 NEW DAY-CARE OCCUPANCIES

SECTION 16.1 GENERAL REQUIREMENTS

16.1.1* Application.

16.1.1.1 The requirements of this chapter apply to the following:

- (1) New buildings or portions thereof used as day-care occupancies (*see 1.4.1*)
- (2) Additions made to, or used as, a day-care occupancy (*see 4.6.6*)
- (3) Alterations, modernizations, or renovations of existing day-care occupancies (*see 4.6.7*)
- (4) Existing buildings or portions thereof upon change of occupancy to a day-care occupancy (*see 4.6.11*)

16.1.1.2 Sections 16.1 through 16.5 and 16.7 establish life safety requirements for day-care occupancies in which more than 12 clients receive care, maintenance, and supervision by other than their relative(s) or legal guardian(s) for less than 24 hours per day.

16.1.1.3 Sections 16.1 (other than 16.1.6), 16.4, 16.5, 16.6, and 16.7 establish life safety requirements for day-care homes as defined in 16.1.3.

16.1.1.4 Where a facility houses more than one age group or self-preservation capability, the strictest requirements applicable to any group present shall apply throughout the day-care occupancy or building, as appropriate to a given area, unless the area housing such a group is maintained as a separate fire area.

16.1.1.5 Places of religious worship shall not be required to meet the provisions of this chapter where providing day-care while services are being held in the building.

16.1.2 Mixed Occupancies. Mixed occupancies shall meet the following criteria.

(a) *General.* Where day-care occupancies are located in a building containing mixed occupancies, the occupancies, other than day-care occupancies in assembly occupancies used primarily for worship, shall be separated by not less than 1-hour fire resistance-rated barriers constructed in accordance with 8.2.3.

(b) *Day-Care Occupancies in Apartment Buildings.* If the two exit accesses from a day-care occupancy enter the same corridor as an apartment occupancy, the exit accesses shall be separated in the corridor by a smoke barrier having not less than a 1-hour fire resistance rating constructed in accordance with Section 8.3. The smoke barrier shall be located so that it has an exit on each side.

16.1.3 Special Definitions.

Day-Care Home. See 3.3.39.

Flexible Plan and Open Plan Educational or Day-Care Building. See 3.3.80.

Self-Preservation (Day-Care Occupancy). See 3.3.176.

Separate Atmosphere. See 3.3.178.

16.1.4 Classification of Occupancy. (*See 6.1.4.*)

16.1.4.1 Occupancies that include part-day preschools, kindergartens, and other schools whose purpose is primarily educational, even though the children who attend such schools

are of preschool age, shall comply with the provisions of Chapter 14.

16.1.4.2 Adult day-care occupancies shall include any building or portion thereof used for less than 24 hours per day to house more than three adults requiring care, maintenance, and supervision by other than their relative(s). Clients shall be ambulatory or semiambulatory and shall not be bedridden. Clients shall not exhibit behavior that is harmful to themselves or others.

16.1.4.3* Conversions. A conversion from a day-care home to a day-care occupancy with more than 12 clients shall be permitted only if the day-care occupancy conforms with the requirements of this chapter for new day-care occupancies with more than 12 clients.

16.1.5 Classification of Hazard of Contents. The contents of day-care occupancies shall be classified as ordinary hazard in accordance with Section 6.2.

16.1.6 Location and Construction.

16.1.6.1 Day-care occupancies, other than day-care homes, shall be limited to the locations, construction types, and sprinkler protection features specified in Table 16.1.6.1.

Table 16.1.6.1 Location and Construction Type Limitations

Location of Day-Care Occupancy	Sprinklered Building	Construction Type
1 story below LED	Yes	I(443), I(332), II(222), II(111), II(000), III(211), IV(2HH), or V(111)
Level of exit discharge	No	Any type
1 story above LED	Yes	Any type
	No	I(443), I(332), II(222)
2 or 3 stories above LED	Yes	I(443), I(332), II(222), II(111), II(000), III(211), or V(111)
>3 stories above LED, but not high-rise	Yes	I(443), I(332), II(222), or II(111)
High-rise	Yes	I(443), I(332), or II(222)

LED: Level of exit discharge.

16.1.6.2 Where day-care occupancies, other than day-care homes, with clients who are 24 months or less in age or who are incapable of self-preservation are located one or more stories above the level of exit discharge, or where day-care occupancies are located two or more stories above the level of exit discharge, smoke barriers shall be provided to divide such stories into not less than two smoke compartments. The smoke barriers shall be constructed in accordance with Section 8.3 but shall not be required to have a fire resistance rating.

16.1.7 Occupant Load.

16.1.7.1 The occupant load, in number of persons for whom means of egress and other provisions are required, shall be determined on the basis of the occupant load factors of Table 7.3.1.2 that are characteristic of the use of the space or shall be

determined as the maximum probable population of the space under consideration, whichever is greater.

16.1.7.2 Where the occupant load is determined as the maximum probable population of the space in accordance with 16.1.7.1, an approved aisle, seating, and exiting diagram shall be required by the authority having jurisdiction to substantiate such a modification.

SECTION 16.2 MEANS OF EGRESS REQUIREMENTS

16.2.1 General. Means of egress shall be in accordance with Chapter 7 and Section 16.2.

16.2.2 Means of Egress Components.

16.2.2.1 Components of means of egress shall be limited to the types described in 16.2.2.2 through 16.2.2.10.

16.2.2.2 Doors.

16.2.2.2.1 General. Doors complying with 7.2.1 shall be permitted.

16.2.2.2.2 Panic Hardware or Fire Exit Hardware. Any door in a required means of egress from an area having an occupant load of 100 or more persons 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.

16.2.2.2.3 Special Locking Arrangements. Special locking arrangements complying with 7.2.1.6 shall be permitted.

16.2.2.2.4* Closet Doors. Every closet door latch shall be such that clients can open the door from inside the closet.

16.2.2.2.5 Bathroom Doors. Every bathroom door lock shall be designed to allow opening of the locked door from the outside in an emergency. The opening device shall be readily accessible to the staff.

16.2.2.3* Stairs. Stairs complying with 7.2.2 shall be permitted.

16.2.2.4 Smokeproof Enclosures. Smokeproof enclosures complying with 7.2.3 shall be permitted.

16.2.2.5 Horizontal Exits. Horizontal exits complying with 7.2.4 shall be permitted.

16.2.2.6 Ramps. Ramps complying with 7.2.5 shall be permitted.

16.2.2.7 Exit Passageways. Exit passageways complying with 7.2.6 shall be permitted.

16.2.2.8 Fire Escape Ladders. Fire escape ladders complying with 7.2.9 shall be permitted.

16.2.2.9 Alternating Tread Devices. Alternating tread devices complying with 7.2.11 shall be permitted.

16.2.2.10 Areas of Refuge. Areas of refuge complying with 7.2.12 shall be permitted.

16.2.3 Capacity of Means of Egress. Capacity of means of egress shall be in accordance with Section 7.3.

16.2.4 Number of Exits. Each floor occupied by clients shall have not less than two exits in accordance with Chapter 7.

16.2.5 Arrangement of Means of Egress. (See also 16.1.6.2.)

16.2.5.1 Means of egress shall be arranged in accordance with Section 7.5.

16.2.5.2 No dead-end corridor shall exceed 20 ft (6.1 m), other than in buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, in which case dead-end corridors shall not exceed 50 ft (15 m).

16.2.5.3 No common path of travel shall exceed 75 ft (23 m), other than for the first 100 ft (30 m) in a building protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

16.2.6 Travel Distance to Exits.

16.2.6.1 Travel distance shall be measured in accordance with Section 7.6.

16.2.6.2 Travel distance shall meet the following criteria:

- (1) The travel distance between any room door intended as an exit access and an exit shall not exceed 100 ft (30 m).
- (2) The travel distance between any point in a room and an exit shall not exceed 150 ft (45 m).
- (3) The travel distance between any point in a sleeping room and an exit access door in that room shall not exceed 50 ft (15 m).

Exception: The travel distance in 16.2.6.2(1) and (2) shall be permitted to be increased by 50 ft (15 m) in buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

16.2.7 Discharge from Exits. Discharge from exits shall be arranged in accordance with Section 7.7.

16.2.8 Illumination of Means of Egress. Means of egress shall be illuminated in accordance with Section 7.8.

16.2.9 Emergency Lighting. Emergency lighting shall be provided in accordance with Section 7.9 in the following areas:

- (1) Interior stairs and corridors
- (2) Assembly use spaces
- (3) Flexible and open plan buildings
- (4) Interior or windowless portions of buildings
- (5) Shops and laboratories

16.2.10 Marking of Means of Egress. Means of egress shall have signs in accordance with Section 7.10.

16.2.11 Special Means of Egress Features.

16.2.11.1 Windows for Rescue. Every room or space normally subject to client occupancy, other than bathrooms, shall have not less than one outside window for emergency rescue that complies with the following:

- (1) Such windows shall be openable from the inside without the use of tools and shall provide a clear opening of not less than 20 in. (51 cm) in width, 24 in. (61 cm) in height, and 5.7 ft² (0.53 m²) in area.
- (2) The bottom of the opening shall be not more than 44 in. (112 cm) above the floor.
- (3) The clear opening shall allow a rectangular solid, with a width and height that provides not less than the required 5.7-ft² (0.53-m²) opening and a depth of not less than 20 in. (51 cm), to pass fully through the opening.

Exception No. 1: This requirement shall not apply to buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

Exception No. 2: This requirement shall not apply where the room or space has a door leading directly to the outside of the building.

SECTION 16.3 PROTECTION

16.3.1 Protection of Vertical Openings. Any vertical opening, other than unprotected vertical openings in accordance with 8.2.5.8, shall be enclosed or protected in accordance with 8.2.5.

16.3.2 Protection from Hazards.

16.3.2.1 Rooms or spaces for the storage, processing, or use of materials specified in 16.3.2.1(1) through (3) shall be protected in accordance with the following:

- (1) Separation from the remainder of the building by fire barriers having a fire resistance rating of not less than 1 hour or protection of such rooms by automatic extinguishing systems as specified in Section 8.4 in the following areas:
 - a. Boiler and furnace rooms

Exception: Boiler and furnace rooms shall be exempt from the requirement of 16.3.2.1(1)a where they enclose only air-handling equipment.

- b. Rooms or spaces used for the storage of combustible supplies in quantities deemed hazardous by the authority having jurisdiction
- c. Rooms or spaces used for the storage of hazardous materials or flammable or combustible liquids in quantities deemed hazardous by recognized standards
- d. Janitor closets

Exception: Doors to janitor closets shall be permitted to have ventilating lowers where the space is protected by automatic sprinklers.

- (2) Separation from the remainder of the building by fire barriers having a fire resistance rating of not less than 1 hour and protection of such rooms by automatic extinguishing systems as specified in Section 8.4 in the following areas:
 - a. *Laundries
 - b. Maintenance shops, including woodworking and painting areas
 - c. Rooms or spaces used for processing or use of combustible supplies deemed hazardous by the authority having jurisdiction
 - d. Rooms or spaces used for processing or use of hazardous materials or flammable or combustible liquids in quantities deemed hazardous by recognized standards
- (3) Where automatic extinguishing is used to meet the requirements of 16.3.2.1(1) and (2), the protection shall be permitted in accordance with 9.7.1.2.

16.3.2.2 Food preparation facilities protected in accordance with 9.2.3 shall not be required to have openings protected between food preparation areas and dining areas. Where domestic cooking equipment is used for food warming or limited cooking, protection or segregation of food preparation facilities shall not be required if approved by the authority having jurisdiction.

16.3.3 Interior Finish.

16.3.3.1 Interior finish shall be in accordance with Section 10.2.

16.3.3.2 Interior Wall and Ceiling Finish. Interior wall and ceiling finish materials in accordance with 10.2.3 shall be Class A in stairways, corridors, and lobbies; in all other occupied areas, interior wall and ceiling finish shall be Class A or Class B.

16.3.3.3 Interior Floor Finish. Interior floor finish materials in accordance with 10.2.7 shall be Class I or Class II within corridors and exits.

16.3.4 Detection, Alarm, and Communications Systems.

16.3.4.1 General. Day-care occupancies, other than day-care occupancies housed in one room, shall be provided with a fire alarm system in accordance with Section 9.6.

16.3.4.2 Initiation. Initiation of the required fire alarm system shall be by manual means and by operation of any required smoke detectors and required sprinkler systems. (*See 16.3.4.5.*)

16.3.4.3 Occupant Notification.

16.3.4.3.1 Occupant notification shall be in accordance with 9.6.3.

16.3.4.3.2 Positive alarm sequence shall be permitted in accordance with 9.6.3.4.

16.3.4.4 Emergency Forces Notification. Fire department notification shall be accomplished in accordance with 9.6.4.

16.3.4.5 Detection. A smoke detection system in accordance with Section 9.6 shall be installed in day-care occupancies, other than those housed in one room. Detectors shall be installed on each story in front of the doors to the stairways and in the corridors of all floors occupied by the day-care occupancy. Detectors also shall be installed in lounges, recreation areas, and sleeping rooms in the day-care occupancy.

16.3.5 Extinguishment Requirements. Any required sprinkler systems shall be in accordance with Section 9.7.

16.3.6 Corridors. Every interior corridor shall be constructed of walls having not less than a 1-hour fire resistance rating in accordance with 8.2.3.

Exception No. 1: Corridor protection shall not be required where all spaces normally subject to client occupancy have not less than one door opening directly to the outside or to an exterior exit access balcony or corridor in accordance with 7.5.3.

Exception No. 2: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, corridor walls shall not be required to be rated, provided that such walls form smoke partitions in accordance with 8.2.4.

Exception No. 3: Where the corridor ceiling is an assembly having a 1-hour fire resistance rating where tested as a wall, the corridor walls shall be permitted to terminate at the corridor ceiling.

Exception No. 4: Lavatories shall not be required to be separated from corridors, provided that they are separated from all other spaces by walls having not less than a 1-hour fire resistance rating in accordance with 8.2.3.

SECTION 16.4 SPECIAL PROVISIONS

16.4.1 Windowless Buildings and Underground Buildings. Windowless buildings and underground buildings shall comply with Section 11.7.

16.4.2 High-Rise Buildings. High-rise buildings that house day-care occupancies on floors more than 75 ft (23 m) above the lowest level of fire department vehicle access shall comply with Section 11.8.

16.4.3 Flexible Plan and Open Plan Buildings.

16.4.3.1 Flexible plan and open plan buildings shall comply with the requirements of this chapter as modified by 16.4.3.2 through 16.4.3.4.

16.4.3.2 Flexible plan buildings shall be permitted to have walls and partitions rearranged periodically only if revised plans or diagrams have been approved by the authority having jurisdiction.

16.4.3.3 Flexible plan buildings shall be evaluated while all folding walls are extended and in use as well as when they are in the retracted position.

16.4.3.4 Each room occupied by more than 300 persons shall have two or more means of egress entering into separate atmospheres. Where three or more means of egress are required, the number of means of egress permitted to enter into a common atmosphere shall not exceed two.

SECTION 16.5 BUILDING SERVICES

16.5.1 Utilities.

16.5.1.1 Utilities shall comply with the provisions of Section 9.1.

16.5.1.2 Special protective covers for all electrical receptacles shall be installed in all areas occupied by clients.

16.5.2 Heating, Ventilating, and Air Conditioning Equipment.

16.5.2.1 Heating, ventilating, and air conditioning equipment shall be in accordance with Section 9.2.

16.5.2.2 Unvented fuel-fired room heaters, other than gas space heaters in compliance with NFPA 54, *National Fuel Gas Code*, shall not be permitted.

16.5.2.3 Any heating equipment in spaces occupied by clients shall be provided with partitions, screens, or other means to protect clients from hot surfaces and open flames. If solid partitions are used to provide such protection, provisions shall be made to ensure adequate air for combustion and ventilation for the heating equipment.

16.5.3 Elevators, Escalators, and Conveyors. Elevators, escalators, and conveyors, other than those in day-care homes, shall comply with the provisions of Section 9.4.

16.5.4 Rubbish Chutes, Incinerators, and Laundry Chutes. Rubbish chutes, incinerators, and laundry chutes, other than those in day-care homes, shall comply with the provisions of Section 9.5.

SECTION 16.6 DAY-CARE HOMES

16.6.1 General Requirements.

16.6.1.1 Application.

16.6.1.1.1 The requirements of Section 16.6 apply to the following:

- (1) New buildings or portions thereof used as day-care homes (*see 1.4.1*)
- (2) Additions made to, or used as, a day-care home (*see 4.6.6*)
- (3) Alterations, modernizations, or renovations of existing day-care homes (*see 4.6.7*)
- (4) Existing buildings or portions thereof upon change of occupancy to a day-care home (*see 4.6.11*)

16.6.1.1.2 Section 16.6 establishes life safety requirements for day-care homes in which more than three, but not more than 12, clients receive care, maintenance, and supervision by other than their relative(s) or legal guardian(s) for less than 24 hours per day, generally within a dwelling unit. (*See also 16.6.1.4.*)

16.6.1.1.3 Where a facility houses more than one age group or self-preservation capability, the strictest requirements applicable to any group present shall apply throughout the day-care home or building, as appropriate to a given area, unless the area housing such a group is maintained as a separate fire area.

16.6.1.1.4 Facilities that supervise clients on a temporary basis with a parent or guardian in close proximity shall not be required to meet the provisions of Section 16.6.

16.6.1.1.5 Places of religious worship shall not be required to meet the provisions of Section 16.6 where operating a nursery while services are being held in the building.

16.6.1.2 Mixed Occupancies. (*See 16.1.2.*)

16.6.1.3 Special Definitions. (*See 16.1.3.*)

16.6.1.4 Classification of Occupancy.

16.6.1.4.1 Subclassification of Day-Care Homes. Subclassification of day-care homes shall be as follows.

(a) *Family Day-Care Home.* A family day-care home is a day-care home in which more than three, but fewer than seven, clients receive care, maintenance, and supervision by other than their relative(s) or legal guardian(s) for less than 24 hours per day, generally within a dwelling unit. Requirements for family day-care homes are based on a minimum staff-to-client ratio of one staff member for up to six clients, including the caretaker's own children under age six, with the number of clients incapable of self-preservation not to exceed two.

(b) *Group Day-Care Home.* A group day-care home is a day-care home in which not less than seven, but not more than 12, clients receive care, maintenance, and supervision by other than their relative(s) or legal guardian(s) for less than 24 hours per day, generally within a dwelling unit. Requirements for group day-care homes are based on a minimum staff-to-client ratio of two staff members for up to 12 clients, with the number of clients incapable of self-preservation not to exceed three. This staff-to-client ratio shall be permitted to be modified by the authority having jurisdiction where safeguards in addition to those specified by Section 16.6 are provided.

16.6.1.4.2* Conversions. A conversion from a day-care home to a day-care occupancy with more than 12 clients shall be permitted only if the day-care occupancy conforms with the requirements of Chapter 16 for new day-care occupancies with more than 12 clients.

16.6.1.5 Classification of Hazard of Contents. (*See 16.1.5.*)

16.6.1.6 Location and Construction. No day-care home shall be located more than one story below the level of exit discharge.

16.6.1.7 Occupant Load. (No special requirements.)

16.6.2 Means of Escape Requirements.

16.6.2.1 General. Means of escape shall comply with Section 24.2.

16.6.2.2 (Reserved.)

16.6.2.3 (Reserved.)

16.6.2.4 Number of Means of Escape. The number of means of escape shall comply with Section 24.2 and 16.6.2.4.1 through 16.6.2.4.4.

16.6.2.4.1 In group day-care homes, every story occupied by clients shall have not less than two remotely located means of escape.

16.6.2.4.2 Every room used for sleeping, living, or dining purposes shall have not less than two means of escape, not less than one of which shall be a door or stairway providing a means of unobstructed travel to the outside of the building at street or ground level. The second means of escape shall be permitted to be a window in accordance with 16.2.11.1. No room or space that is accessible only by a ladder or folding stairs or through a trap door shall be occupied for living or sleeping purposes.

16.6.2.4.3 In group day-care homes where spaces on the story above the level of exit discharge are used by clients, not less than one means of escape shall be an exit discharging directly to the outside. The second means of escape shall be permitted to be a window in accordance with 16.2.11.1.

16.6.2.4.4 Where clients occupy a story below the level of exit discharge, not less than one means of escape shall be an exit discharging directly to the outside, and the vertical travel to ground level shall not exceed 8 ft (2.4 m). The second means of escape shall be permitted to be a window in accordance with 16.2.11.1.

16.6.2.5 Arrangement of Means of Egress.

16.6.2.5.1 A story used above or below the level of exit discharge shall be in accordance with 16.6.2.4.3 and 16.6.2.4.4.

16.6.2.5.2 For group day-care homes, means of egress shall be arranged in accordance with Section 7.5.

16.6.2.5.3 Dead-end corridors shall not exceed 20 ft (6.1 m).

16.6.2.6 Travel Distance. Travel distance shall meet the following criteria:

- (1) The travel distance between any room door intended as an exit access and an exit shall not exceed 100 ft (30 m).
- (2) The travel distance between any point in a room and an exit shall not exceed 150 ft (45 m).
- (3) The travel distance between any point in a sleeping room and an exit access to that room shall not exceed 50 ft (15 m).

Exception: The travel distance in 16.6.2.6(1) and (2) shall be permitted to be increased by 50 ft (15 m) in buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

16.6.2.7 Discharge from Exits. (See 16.6.2.4.)

16.6.2.8 Illumination of Means of Egress. Means of egress shall be illuminated in accordance with Section 7.8.

16.6.2.9 Emergency Lighting. (No requirements.)

16.6.2.10 Marking of Means of Egress. (No requirements.)

16.6.3 Protection.

16.6.3.1 Protection of Vertical Openings. For group day-care homes, the doorway between the level of exit discharge and any story below shall be equipped with a door assembly having a 20-minute fire protection rating. Where the story above the level of exit discharge is used for sleeping purposes,

there shall be a door assembly having a 20-minute fire protection rating at the top or bottom of each stairway.

16.6.3.2 Protection from Hazards. (No requirements.)

16.6.3.3 Interior Finish.

16.6.3.3.1 Interior finish shall be in accordance with Section 10.2.

16.6.3.3.2 In group day-care homes, interior wall and ceiling finish materials in accordance with 8.2.3 shall be Class A or Class B in corridors, stairways, lobbies, and exits. In the exits of family day-care homes, interior wall and ceiling finish materials in accordance with 10.2.3 shall be Class A or Class B.

16.6.3.3.3 Interior wall and ceiling finish materials in accordance with 10.2.3 shall be Class A, Class B, or Class C in occupied spaces.

16.6.3.3.4 Interior Floor Finish. (No requirements.)

16.6.3.4 Detection, Alarm, and Communications Systems.

16.6.3.4.1 Smoke alarms shall be installed within day-care homes in accordance with 9.6.2.10.

16.6.3.4.2 Where the day-care home is located within a building of another occupancy, such as in an apartment building or office building, any corridors serving the day-care home shall be provided with a smoke detection system in accordance with Section 9.6.

16.6.3.4.3 Single-station smoke alarms in accordance with 9.6.2.10 that are powered by the building electrical system, or system detectors with integral sounding devices in accordance with 9.6.1.4, shall be provided in all rooms used for sleeping.

SECTION 16.7 OPERATING FEATURES

16.7.1* Fire Emergency Response Plans. The facility shall have a comprehensive written fire emergency response plan. Copies of the plan shall be made available to all employees. All employees shall be periodically instructed and kept informed with respect to the duties of their position under the plan.

16.7.2 Emergency Egress and Relocation Drills.

16.7.2.1* Emergency egress and relocation drills shall be conducted in accordance with Section 4.7 and the applicable provisions of 16.7.2.2.

16.7.2.2 Emergency egress and relocation drills shall be conducted as follows:

- (1) Not less than one emergency egress and relocation drill shall be conducted every month the facility is in session.

Exception: In climates where the weather is severe, the monthly emergency egress and relocation drills shall be permitted to be deferred, provided that the required number of emergency egress and relocation drills is achieved and not less than four are conducted before the drills are deferred.

- (2) All occupants of the building shall participate in the drill.
- (3) One additional emergency egress and relocation drill, other than for day-care occupancies that are open on a year-round basis, shall be required within the first 30 days of operation.

16.7.3 Inspections.

16.7.3.1 Fire prevention inspections shall be conducted monthly by a trained senior member of the staff. A copy of

the latest inspection report shall be posted in a conspicuous place in the day-care facility.

16.7.3.2* It shall be the duty of site administrators and staff members to inspect all exit facilities daily to ensure that all stairways, doors, and other exits are in proper condition.

16.7.3.3 Open plan buildings shall require extra surveillance to ensure that exit paths are maintained clear of obstruction and are obvious.

16.7.4 Furnishings and Decorations.

16.7.4.1 Draperies, curtains, and other similar furnishings and decorations in day-care occupancies shall be in accordance with the provisions of 10.3.1.

16.7.4.2 Clothing and personal effects shall not be stored in corridors.

Exception No. 1: This requirement shall not apply to corridors protected by an automatic sprinkler system in accordance with Section 9.7.

Exception No. 2: This requirement shall not apply to corridor areas protected by a smoke detection system in accordance with Section 9.6.

Exception No. 3: This requirement shall not apply to storage in metal lockers, provided that the required egress width is maintained.

16.7.4.3 Artwork and teaching materials shall be permitted to be attached directly to the walls and shall not exceed 20 percent of the wall area.

16.7.5* Day-Care Staff. Adequate adult staff shall be on duty, alert, awake, and in the facility at all times where clients are present.

Chapter 17 EXISTING DAY-CARE OCCUPANCIES

SECTION 17.1 GENERAL REQUIREMENTS

17.1.1* Application.

17.1.1.1 The requirements of this chapter apply to existing buildings or portions thereof currently occupied as day-care occupancies. (See also 16.1.1.1.)

17.1.1.2 Sections 17.1 through 17.5 and 17.7 establish life safety requirements for existing day-care occupancies in which more than 12 clients receive care, maintenance, and supervision by other than their relative(s) or legal guardian(s) for less than 24 hours per day. An existing day-care occupancy shall be permitted the option of meeting the requirements of Chapter 16 in lieu of Chapter 17. An existing day-care occupancy that meets the requirements of Chapter 16 shall be judged as meeting the requirements of Chapter 17.

17.1.1.3 Sections 17.1 (other than 17.1.6), 17.4, 17.5, 17.6, and 17.7 establish life safety requirements for existing day-care homes as defined in 17.1.3. An existing day-care home shall be permitted the option of meeting the requirements of Chapter 16 in lieu of Chapter 17. An existing day-care home that meets the requirements of Chapter 16 shall be judged as meeting the requirements of Chapter 17.

17.1.1.4 Where a facility houses clients of more than one self-preservation capability, the strictest requirements applicable to any group present shall apply throughout the day-care occupancy or building, as appropriate to a given area, unless the area housing such a group is maintained as a separate fire area.

17.1.1.5 Places of religious worship shall not be required to meet the provisions of this chapter where providing day-care while services are being held in the building.

17.1.2 Mixed Occupancies. Mixed occupancies shall meet the following criteria.

(a) *General.* Where day-care occupancies are located in a building containing mixed occupancies, the occupancies, other than day-care centers in assembly occupancies used primarily for worship, shall be separated by not less than 1-hour fire resistance-rated barriers constructed in accordance with 8.2.3.

(b) *Day-Care Centers in Apartment Buildings.* If the two exit accesses from a day-care occupancy enter the same corridor as an apartment occupancy, the exit accesses shall be separated in the corridor by a smoke barrier having not less than a 1-hour fire resistance rating constructed in accordance with Section 8.3. The smoke barrier shall be located so that it has an exit on each side.

17.1.3 Special Definitions.

Day-Care Home. See 3.3.39.

Flexible Plan and Open Plan Educational or Day-Care Building. See 3.3.80.

Self-Preservation (Day-Care Occupancy). See 3.3.176.

Separate Atmosphere. See 3.3.178.

17.1.4 Classification of Occupancy. (See 6.1.4.)

17.1.4.1 Occupancies that include part-day preschools, kindergartens, and other schools whose purpose is primarily educational, even though the children who attend such schools are of preschool age, shall comply with the provisions of Chapter 15.

17.1.4.2 Adult day-care occupancies shall include any building or portion thereof used for less than 24 hours per day to house more than three adults requiring care, maintenance, and supervision by other than their relative(s). Clients shall be ambulatory or semiambulatory and shall not be bedridden. Clients shall not exhibit behavior that is harmful to themselves or others.

17.1.4.3* Conversions. A conversion from a day-care home to a day-care occupancy with more than 12 clients shall be permitted only if the day-care occupancy conforms with the requirements of Chapter 16 for new day-care occupancies with more than 12 clients.

17.1.5 Classification of Hazard of Contents. The contents of day-care occupancies shall be classified as ordinary hazard in accordance with Section 6.2.

17.1.6 Location and Construction. Day-care occupancies, other than day-care homes, shall be limited to the locations, construction types, and sprinkler protection features specified in Table 17.1.6.

Table 17.1.6 Location and Construction Type Limitations

Location of Day-Care Occupancy	Sprinklered Building	Construction Type
1 story below LED	Yes	I(443), I(332), II(222), II(111), II(000), III(211), IV(2HH), V(111)
	No	I(443), I(332), II(222), II(111), III(211), IV(2HH), V(111)
Level of exit discharge	Yes	Any type
	No	Any type
1 story above LED	Yes	Any type
	No	I(443), I(332), II(222)
	No	II(111)*, III(211)*, V(111)*
2 stories above LED	Yes	I(443), I(332), II(222)
	Yes	II(111)*, III(211)*, V(111)*
	No	I(443), I(332), II(222)
>3 stories above LED but not high-rise	Yes	I(443), I(332), II(222)
	Yes	II(111)*
	No	I(443), I(332), II(222)
High-rise	Yes	I(443), I(332), II(222)
	No	Not permitted

LED: Level of exit discharge.

*Permitted only if clients capable of self-preservation.

17.1.7 Occupant Load.

17.1.7.1 The occupant load, in number of persons for whom means of egress and other provisions are required, shall be determined on the basis of the occupant load factors of Table 7.3.1.2 that are characteristic of the use of the space or shall be determined as the maximum probable population of the space under consideration, whichever is greater.

17.1.7.2 Where the occupant load is determined as the maximum probable population of the space in accordance with 17.1.7.1, an approved aisle, seating, and exiting diagram shall be required by the authority having jurisdiction to substantiate such a modification.

SECTION 17.2 MEANS OF EGRESS REQUIREMENTS

17.2.1 General. Means of egress shall be in accordance with Chapter 7 and Section 17.2.

17.2.2 Means of Egress Components.

17.2.2.1 Components of means of egress shall be limited to the types described in 17.2.2.2 through 17.2.2.10.

17.2.2.2 Doors.

17.2.2.2.1 General. Doors complying with 7.2.1 shall be permitted.

17.2.2.2.2 Panic Hardware or Fire Exit Hardware. Any door in a required means of egress from an area having an occupant load of 100 or more persons 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.

17.2.2.2.3 Special Locking Arrangements. Special locking arrangements complying with 7.2.1.6 shall be permitted.

17.2.2.2.4* Closet Doors. Every closet door latch shall be such that clients can open the door from inside the closet.

17.2.2.2.5 Bathroom Doors. Every bathroom door lock shall be designed to allow opening of the locked door from the outside in an emergency. The opening device shall be readily accessible to the staff.

17.2.2.3* Stairs.

17.2.2.3.1 Stairs complying with 7.2.2 shall be permitted.

17.2.2.3.2 Existing Class A stairs shall be permitted.

17.2.2.3.3 Existing Class B stairs shall be permitted where not used by clients.

17.2.2.4 Smokeproof Enclosures. Smokeproof enclosures complying with 7.2.3 shall be permitted.

17.2.2.5 Horizontal Exits.

17.2.2.5.1 Horizontal exits complying with 7.2.4 shall be permitted.

17.2.2.5.2 Areas of refuge, other than in buildings provided with smokeproof enclosures or buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, shall be provided by horizontal exits for occupants of day-care occupancies located above the fifth story.

17.2.2.6 Ramps. Ramps complying with 7.2.5 shall be permitted.

17.2.2.7 Exit Passageways. Exit passageways complying with 7.2.6 shall be permitted.

17.2.2.8 Fire Escape Ladders. Fire escape ladders complying with 7.2.9 shall be permitted.

17.2.2.9 Alternating Tread Devices. Alternating tread devices complying with 7.2.11 shall be permitted.

17.2.2.10 Areas of Refuge. Areas of refuge complying with 7.2.12 shall be permitted.

17.2.3 Capacity of Means of Egress. Capacity of means of egress shall be in accordance with Section 7.3.

17.2.4 Number of Exits.

17.2.4.1 Each floor occupied by clients shall have not less than two exits in accordance with Chapter 7.

17.2.4.2 Where the story below the level of exit discharge is occupied as a day-care occupancy, 17.2.4.2.1 and 17.2.4.2.2 shall apply.

17.2.4.2.1 One means of egress shall be an outside or interior stair in accordance with 7.2.2. An interior stair, if used, shall serve only the story below the level of exit discharge. The interior stair shall be permitted to communicate with the level of exit discharge; however, the exit route from the level of exit discharge shall not pass through the stair enclosure.

17.2.4.2.2 The second means of egress shall be permitted to be via an unenclosed stairway separated from the level of exit discharge in accordance with 8.2.5.4. The path of egress travel on the level of exit discharge shall be protected in accordance with 7.1.3.1.

Exception: The path of egress on the level of exit discharge shall be permitted to be unprotected if the level of exit discharge and the level below the level of exit discharge are protected throughout by a smoke detection system or an approved automatic sprinkler system.

17.2.5 Arrangement of Means of Egress.

17.2.5.1 Means of egress shall be arranged in accordance with Section 7.5.

17.2.5.2 No dead-end corridor shall not exceed 20 ft (6.1 m), other than in buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, in which case dead-end corridors shall not exceed 50 ft (15 m).

17.2.5.3 Common paths of travel shall not exceed 75 ft (23 m), other than for the first 100 ft (30 m) in a building protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

17.2.5.4 The story used below the level of exit discharge shall be in accordance with 17.2.4.2.

17.2.6 Travel Distance to Exits.

17.2.6.1 Travel distance shall be measured in accordance with Section 7.6.

17.2.6.2 Travel distance shall meet the following criteria:

- (1) The travel distance between any room door intended as an exit access and an exit shall not exceed 100 ft (30 m).
- (2) The travel distance between any point in a room and an exit shall not exceed 150 ft (45 m).

- (3) The travel distance between any point in a sleeping room and an exit access door in that room shall not exceed 50 ft (15 m).

Exception: The travel distance in 17.2.6.2(1) and (2) shall be permitted to be increased by 50 ft (15 m) in buildings protected throughout by an approved automatic sprinkler system in accordance with Section 9.7.

17.2.7 Discharge from Exits. Discharge from exits shall be arranged in accordance with Section 7.7, unless otherwise provided in 17.2.4.2.

17.2.8 Illumination of Means of Egress. Means of egress shall be illuminated in accordance with Section 7.8.

17.2.9 Emergency Lighting. Emergency lighting shall be provided in accordance with Section 7.9 in the following areas:

- (1) Interior stairs and corridors
- (2) Assembly use spaces
- (3) Flexible and open plan buildings
- (4) Interior or windowless portions of buildings
- (5) Shops and laboratories

17.2.10 Marking of Means of Egress. Means of egress shall have signs in accordance with Section 7.10.

17.2.11 Special Means of Egress Features.

17.2.11.1 Windows for Rescue. Every room or space greater than 250 ft² (23.2 m²) normally subject to client occupancy shall have not less than one outside window for emergency rescue that complies with the following:

- (1) Such windows shall be openable from the inside without the use of tools and shall provide a clear opening of not less than 20 in. (51 cm) in width, 24 in. (61 cm) in height, and 5.7 ft² (0.53 m²) in area.
- (2) The bottom of the opening shall be not more than 44 in. (112 cm) above the floor.
- (3) The clear opening shall allow a rectangular solid, with a width and height that provides not less than the required 5.7 ft² (0.53 m²) opening and a depth of not less than 20 in. (51 cm), to pass fully through the opening.

Exception No. 1: This requirement shall not apply to buildings protected throughout by an approved automatic sprinkler system in accordance with Section 9.7.

Exception No. 2: This requirement shall not apply where the room or space has a door leading directly to the outside of the building.

Exception No. 3: This requirement shall not apply to rooms located higher than three stories above grade.

Exception No. 4: Awning-type or hopper-type windows that are hinged or subdivided to provide a clear opening not less than 600 in.² (3900 cm²) in area, nor any dimension less than 22 in. (55.9 cm), shall be permitted to continue to be used. Screen walls or devices in front of required windows shall not interfere with normal rescue requirements.

Exception No. 5: This requirement shall not apply where the room or space complies with the following:

(a) Doors shall exist that allow travel between adjacent classrooms. Where such doors are used to travel from classroom to classroom, they shall provide direct access to exits in both directions or direct access to an exit in one direction and to a separate smoke compartment that provides access to another exit in the other direction.

(b) The corridor shall be separated from the classrooms by a wall that resists the passage of smoke, and all doors between the classrooms

and the corridor shall be self-closing in accordance with 7.2.1.8.

(c) The length of travel to exits along such paths shall not exceed 150 ft (45 m).

(d) Each communicating door shall be marked in accordance with Section 7.10.

(e) No locking device shall be permitted on the communicating doors.

SECTION 17.3 PROTECTION

17.3.1 Protection of Vertical Openings. Any vertical opening, other than unprotected vertical openings in accordance with 8.2.5.8, shall be enclosed or protected in accordance with 8.2.5.

17.3.2 Protection from Hazards.

17.3.2.1 Rooms or spaces for the storage, processing, or use of materials specified in 17.3.2.1(1) through (3) shall be protected in accordance with the following:

- (1) Separation from the remainder of the building by fire barriers having a fire resistance rating of not less than 1 hour or protection of such rooms by automatic extinguishing systems as specified in Section 8.4 in the following areas:

- a. Boiler and furnace rooms

Exception: Boiler and furnace rooms shall be exempt from the requirement of 17.3.2.1(1)a where they enclose only air-handling equipment.

- b. Rooms or spaces used for the storage of combustible supplies in quantities deemed hazardous by the authority having jurisdiction
- c. Rooms or spaces used for the storage of hazardous materials or flammable or combustible liquids in quantities deemed hazardous by recognized standards
- d. Janitor closets

Exception: Doors to janitor closets shall be permitted to have ventilating lowers where the space is protected by automatic sprinklers.

- (2) Separation from the remainder of the building by fire barriers having a fire resistance rating of not less than 1 hour and protection of such rooms by automatic extinguishing systems as specified in Section 8.4 in the following areas:

- a. *Laundries
- b. Maintenance shops, including woodworking and painting areas
- c. Rooms or spaces used for processing or use of combustible supplies deemed hazardous by the authority having jurisdiction
- d. Rooms or spaces used for processing or use of hazardous materials or flammable or combustible liquids in quantities deemed hazardous by recognized standards

- (3) Where automatic extinguishing is used to meet the requirements of 17.3.2.1(1) and (2), the protection shall be permitted in accordance with 9.7.1.2.

17.3.2.2 Food preparation facilities protected in accordance with 9.2.3 shall not be required to have openings protected between food preparation areas and dining areas. Where domestic cooking equipment is used for food warming or limited cooking, protection or segregation of food preparation facilities shall not be required if approved by the authority having jurisdiction.

17.3.3 Interior Finish.

17.3.3.1 Interior finish shall be in accordance with Section 10.2.

17.3.3.2 Interior Wall and Ceiling Finish. Interior wall and ceiling finish materials in accordance with 10.2.3 shall be Class A or Class B throughout.

17.3.3.3 Interior Floor Finish. (No requirements.)

17.3.4 Detection, Alarm, and Communications Systems.

17.3.4.1 General. Day-care occupancies, other than day-care occupancies housed in one room, shall be provided with a fire alarm system in accordance with Section 9.6.

17.3.4.2 Initiation. Initiation of the required fire alarm system shall be by manual means and by operation of any required smoke detectors and required sprinkler systems. (See 17.3.4.5.)

17.3.4.3 Occupant Notification.

17.3.4.3.1 Occupant notification shall be in accordance with 9.6.3.

17.3.4.3.2 Positive alarm sequence shall be permitted in accordance with 9.6.3.4.

17.3.4.4 Emergency Forces Notification. Fire department notification, other than for day-care occupancies with not more than 100 clients, shall be accomplished in accordance with 9.6.4.

17.3.4.5 Detection. A smoke detection system in accordance with Section 9.6 shall be installed in day-care occupancies, other than those housed in one room or those housing clients capable of self-preservation if no sleeping facilities are provided. Detectors shall be installed on each story in front of the doors to the stairways and in the corridors of all floors occupied by the day-care occupancy. Detectors also shall be installed in lounges, recreation areas, and sleeping rooms in the day-care occupancy.

17.3.5 Extinguishment Requirements. Any required sprinkler system shall be in accordance with Section 9.7.

17.3.6 Corridors. Every interior corridor shall be constructed of walls having not less than a 1/2-hour fire resistance rating in accordance with 8.2.3.

Exception No. 1: Corridor protection shall not be required where all spaces normally subject to student occupancy have not less than one door opening directly to the outside or to an exterior exit access balcony or corridor in accordance with 7.5.3.

Exception No. 2: In buildings protected throughout by an approved automatic sprinkler system with valve supervision in accordance with Section 9.7, corridor walls shall not be required to be rated, provided that such walls form smoke partitions in accordance with 8.2.4.

Exception No. 3: Where the corridor ceiling is an assembly having a 1/2-hour fire resistance rating where tested as a wall, the corridor walls shall be permitted to terminate at the corridor ceiling.

Exception No. 4: Lavatories shall not be required to be separated from corridors, provided that they are separated from all other spaces by walls having not less than a 1/2-hour fire resistance rating in accordance with 8.2.3.

Exception No. 5: Existing doors in 1/2-hour fire resistance-rated corridors shall be permitted to be 1 3/4-in. (4.4-cm) thick, solid-bonded wood core doors or the equivalent.

SECTION 17.4 SPECIAL PROVISIONS

17.4.1 Windowless Buildings and Underground Buildings. Windowless buildings and underground buildings shall comply with Section 11.7.

17.4.2 High-Rise Buildings. High-rise buildings that house day-care occupancies on floors more than 75 ft (23 m) above the lowest level of fire department vehicle access shall comply with Section 11.8.

17.4.3 Flexible Plan and Open Plan Buildings.

17.4.3.1 Flexible plan and open plan buildings shall comply with the requirements of this chapter as modified by 17.4.3.2 and 17.4.3.3.

17.4.3.2 Flexible plan buildings shall be permitted to have walls and partitions rearranged periodically only if revised plans or diagrams have been approved by the authority having jurisdiction.

17.4.3.3 Flexible plan buildings shall be evaluated while all folding walls are extended and in use as well as when they are in the retracted position.

SECTION 17.5 BUILDING SERVICES

17.5.1 Utilities.

17.5.1.1 Utilities shall comply with the provisions of Section 9.1.

17.5.1.2 Special protective covers for all electrical receptacles shall be installed in all areas occupied by clients.

17.5.2 Heating, Ventilating, and Air Conditioning Equipment.

17.5.2.1 Heating, ventilating, and air conditioning equipment shall be in accordance with Section 9.2.

17.5.2.2 Unvented fuel-fired room heaters, other than gas space heaters in compliance with NFPA 54, *National Fuel Gas Code*, shall not be permitted.

17.5.2.3 Any heating equipment in spaces occupied by clients shall be provided with partitions, screens, or other means to protect clients from hot surfaces and open flames. If solid partitions are used to provide such protection, provisions shall be made to ensure adequate air for combustion and ventilation for the heating equipment.

17.5.3 Elevators, Escalators, and Conveyors. Elevators, escalators, and conveyors, other than those in day-care homes, shall comply with the provisions of Section 9.4.

17.5.4 Rubbish Chutes, Incinerators, and Laundry Chutes. Rubbish chutes, incinerators, and laundry chutes, other than those in day-care homes, shall comply with the provisions of Section 9.5.

SECTION 17.6 DAY-CARE HOMES

17.6.1 General Requirements.

17.6.1.1 Application.

17.6.1.1.1 (Reserved.)

17.6.1.1.2* Section 17.6 establishes life safety requirements for existing day-care homes in which more than three, but not more than 12, clients receive care, maintenance, and supervision by other than their relative(s) or legal guardian(s) for less than 24 hours per day, generally within a dwelling unit. An

existing day-care home shall be permitted the option of meeting the requirements of Section 16.6 in lieu of Section 17.6. Any existing day-care home that meets the requirements of Chapter 16 shall be judged as meeting the requirements of this chapter. (See also 17.6.1.4.)

17.6.1.1.3 Where a facility houses clients of more than one self-preservation capability, the strictest requirements applicable to any group present shall apply throughout the day-care home or building, as appropriate to a given area, unless the area housing such a group is maintained as a separate fire area.

17.6.1.1.4 Facilities that supervise clients on a temporary basis with a parent or guardian in close proximity shall not be required to meet the provisions of Section 17.6.

17.6.1.1.5 Places of religious worship shall not be required to meet the provisions of Section 17.6 where operating a day-care home while services are being held in the building.

17.6.1.2 Mixed Occupancies. (See 17.1.2.)

17.6.1.3 Special Definitions. (See 17.1.3.)

17.6.1.4 Classification of Occupancy.

17.6.1.4.1 Subclassification of Day-Care Homes. Subclassification of day-care homes shall be as follows.

(a) *Family Day-Care Home.* A family day-care home is a day-care home in which more than three, but fewer than seven, clients receive care, maintenance, and supervision by other than their relative(s) or legal guardian(s) for less than 24 hours per day, generally within a dwelling unit. Requirements for family day-care homes are based on a minimum staff-to-client ratio of one staff member for up to six clients, including the caretaker's own children under age six, with the number of clients incapable of self-preservation not to exceed two.

(b) *Group Day-Care Home.* A group day-care home is a day-care home in which not less than seven, but not more than 12, clients receive care, maintenance, and supervision by other than their relative(s) or legal guardian(s) for less than 24 hours per day, generally within a dwelling unit. Requirements for group day-care homes are based on a minimum staff-to-client ratio of two staff members for up to 12 clients, with the number of clients incapable of self-preservation not to exceed three. This staff-to-client ratio shall be permitted to be modified by the authority having jurisdiction where safeguards in addition to those specified by Section 17.6 are provided.

17.6.1.4.2* Conversions. A conversion from a day-care home to a day-care occupancy with more than 12 clients shall be permitted only if the day-care occupancy conforms with the requirements of Chapter 16 for new day-care occupancies with more than 12 clients.

17.6.1.5 Classification of Hazard of Contents. (See 17.1.5.)

17.6.1.6 Location and Construction. No day-care home shall be located more than one story below the ground.

17.6.1.7 Occupant Load. (No special requirements.)

17.6.2 Means of Escape Requirements.

17.6.2.1 General. Means of escape shall comply with Section 24.2.

17.6.2.2 (Reserved.)

17.6.2.3 (Reserved.)

17.6.2.4 Number of Means of Escape. The number of means of escape shall comply with Section 24.2 and 17.6.2.4.1 through 17.6.2.4.4.

17.6.2.4.1 In group day-care homes, every story occupied by clients shall have not less than two remotely located means of escape.

17.6.2.4.2 Every room used for sleeping, living, or dining purposes shall have not less than two means of escape, not less than one of which shall be a door or stairway providing a means of unobstructed travel to the outside of the building at street or ground level. The second means of escape shall be permitted to be a window in accordance with 17.2.11.1. No room or space that is accessible only by a ladder or folding stairs or through a trap door shall be occupied for living or sleeping purposes.

17.6.2.4.3 In group day-care homes where spaces on the story above the level of exit discharge are used by clients, not less than one means of escape shall be an exit discharging directly to the outside. The second means of escape shall be permitted to be a window in accordance with 17.2.11.1.

17.6.2.4.4 Where clients occupy a story below the level of exit discharge, not less than one means of escape shall be an exit discharging directly to the outside, and the vertical travel to ground level shall not exceed 8 ft (2.4 m). The second means of escape shall be permitted to be a window in accordance with 17.2.11.1.

17.6.2.5 Arrangement of Means of Egress.

17.6.2.5.1 A story used above or below the level of exit discharge shall be in accordance with 17.6.2.4.3 or 17.6.2.4.4.

17.6.2.5.2 For group day-care homes, means of egress shall be arranged in accordance with Section 7.5.

17.6.2.5.3 No dead-end corridor shall exceed 20 ft (6.1 m), other than in buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, in which case dead-end corridors shall not exceed 50 ft (15 m).

17.6.2.6 Travel Distance. Travel distance shall meet the following criteria:

- (1) The travel distance between any room door intended as an exit access and an exit shall not exceed 100 ft (30 m).
- (2) The travel distance between any point in a room and an exit shall not exceed 150 ft (45 m).
- (3) The travel distance between any point in a sleeping room and an exit access to that room shall not exceed 50 ft (15 m).

Exception: The travel distance in 17.6.2.6(1) and (2) shall be permitted to be increased by 50 ft (15 m) in buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

17.6.2.7 Discharge from Exits. (See 17.6.2.4.)

17.6.2.8 Illumination of Means of Egress. Means of egress shall be illuminated in accordance with Section 7.8.

17.6.2.9 Emergency Lighting. (No requirements.)

17.6.2.10 Marking of Means of Egress. (No requirements.)

17.6.3 Protection.

17.6.3.1 Protection of Vertical Openings. For group day-care homes, the doorway between the level of exit discharge and any story below shall be equipped with a door assembly having a 20-minute fire protection rating. Where the story above the level of exit discharge is used for sleeping purposes, there shall be a door assembly having a 20-minute fire protection rating at the top or bottom of each stairway.

Exception: Existing self-closing 1³/₄-in. (4.4-cm) thick, solid-bonded wood doors without rated frames shall be permitted to be continued to be used by the authority having jurisdiction.

17.6.3.2 Protection from Hazards. (No requirements.)

17.6.3.3 Interior Finish.

17.6.3.3.1 Interior finish shall be in accordance with Section 10.2.

17.6.3.3.2 Interior wall and ceiling finish materials in accordance with 10.2.3 shall be Class A or Class B in exits.

17.6.3.3.3 Interior wall and ceiling finish materials in accordance with 10.2.3 shall be Class A, Class B, or Class C in occupied spaces.

17.6.3.3.4 Interior Floor Finish. (No requirements.)

17.6.3.4 Detection, Alarm, and Communications Systems.

17.6.3.4.1 Smoke alarms shall be installed within day-care homes in accordance with 9.6.2.10.

17.6.3.4.2 Where the day-care home is located within a building of another occupancy, such as in an apartment building or office building, any corridors serving the day-care home shall be provided with a smoke detection system in accordance with Section 9.6.

17.6.3.4.3 Single-station smoke alarms in accordance with 9.6.2.10 that are powered by the building electrical system, or system detectors with integral sounding devices in accordance with 9.6.1.4, shall be provided in all rooms used for sleeping.

Exception: Existing battery-powered smoke alarms rather than house electrical service-powered smoke alarms shall be permitted where, in the opinion of the authority having jurisdiction, the facility has demonstrated testing, maintenance, and battery replacement programs that ensure reliability of power to the smoke alarms.

SECTION 17.7 OPERATING FEATURES

17.7.1* Fire Emergency Response Plans. The facility shall have a comprehensive written fire emergency response plan. Copies of the plan shall be made available to all employees. All employees shall be periodically instructed and kept informed with respect to the duties of their position under the plan.

17.7.2 Emergency Egress and Relocation Drills.

17.7.2.1* Emergency egress and relocation drills shall be conducted in accordance with Section 4.7 and the applicable provisions of 17.7.2.2.

17.7.2.2 Emergency egress and relocation drills shall be conducted as follows:

(1) Not less than one emergency egress and relocation drill shall be conducted every month the facility is in session.

Exception: In climates where the weather is severe, the monthly emergency egress and relocation drills shall be permitted to be deferred, provided that the required number of emergency egress and relocation drills is achieved and not less than four are conducted before the drills are deferred.

(2) All occupants of the building shall participate in the drill.

(3) One additional emergency egress and relocation drill, other than for day-care occupancies that are open on a year-round basis, shall be required within the first 30 days of operation.

17.7.3 Inspections.

17.7.3.1 Fire prevention inspections shall be conducted monthly by a trained senior member of the staff. A copy of the latest inspection report shall be posted in a conspicuous place in the day-care facility.

17.7.3.2* It shall be the duty of site administrators and staff members to inspect all exit facilities daily to ensure that all stairways, doors, and other exits are in proper condition.

17.7.3.3 Open plan buildings shall require extra surveillance to ensure that exit paths are maintained clear of obstruction and are obvious.

17.7.4 Furnishings and Decorations.

17.7.4.1 Draperies, curtains, and other similar furnishings and decorations in day-care occupancies shall be in accordance with the provisions of 10.3.1.

17.7.4.2 Clothing and personal effects shall not be stored in corridors.

Exception No. 1: This requirement shall not apply to corridors protected by an automatic sprinkler system in accordance with Section 9.7.

Exception No. 2: This requirement shall not apply to corridor areas protected by a smoke detection system in accordance with Section 9.6.

Exception No. 3: This requirement shall not apply to storage in metal lockers, provided that the required egress width is maintained.

17.7.4.3 Artwork and teaching materials shall be permitted to be attached directly to the walls and shall not exceed 20 percent of the wall area.

17.7.5* Day-Care Staff. Adequate adult staff shall be on duty, alert, awake, and in the facility at all times where clients are present.

Chapter 18 NEW HEALTH CARE OCCUPANCIES

SECTION 18.1 GENERAL REQUIREMENTS

18.1.1 Application.

18.1.1.1 General.

18.1.1.1.1 The requirements of this chapter apply to the following:

- (1) New buildings or portions thereof used as health care occupancies (*see 1.4.1*)
- (2) Additions made to, or used as, a health care occupancy (*see 4.6.6 and 18.1.1.4*)

Exception: The requirement of 18.1.1.1.1 shall not apply to additions classified as occupancies other than health care that are separated from the health care occupancy in accordance with 18.1.2.1(2) and conform to the requirements for the specific occupancy in accordance with Chapters 12 through 17 and Chapters 20 through 42, as appropriate.

- (3) Alterations, modernizations, or renovations of existing health care occupancies (*see 4.6.7 and 18.1.1.4*)
- (4) Existing buildings or portions thereof upon change of occupancy to a health care occupancy (*see 4.6.11*)

*Exception.** Facilities where the authority having jurisdiction has determined equivalent safety has been provided in accordance with Section 1.5.

18.1.1.1.2 This chapter establishes life safety requirements for the design of all new hospitals, nursing homes, and limited care facilities. The term *hospital*, wherever used in this Code, shall include general hospitals, psychiatric hospitals, and specialty hospitals. The term *nursing home*, wherever used in this Code, shall include nursing and convalescent homes, skilled nursing facilities, intermediate care facilities, and infirmaries in homes for the aged. Where requirements vary, the specific subclass of health care occupancy is named in the paragraph pertaining thereto. Chapter 20 establishes life safety requirements for all new ambulatory health care facilities. Section 18.7 establishes operating features requirements for all health care occupancies.

18.1.1.1.3 Health care facilities regulated by this chapter provide sleeping accommodations for their occupants and are occupied by persons who are mostly incapable of self-preservation because of age, because of physical or mental disability, or because of security measures not under the occupants' control.

18.1.1.1.4 Buildings, or sections of buildings, that primarily house patients who, in the opinion of the governing body of the facility and the governmental agency having jurisdiction, are capable of judgment and appropriate physical action for self-preservation under emergency conditions shall be permitted to comply with chapters of this Code other than Chapter 18.

18.1.1.1.5 It shall be recognized that, in buildings housing certain types of patients or having detention rooms or a security section, it might be necessary to lock doors and bar windows to confine and protect building inhabitants. In such instances, the authority having jurisdiction shall make appropriate modifications to those sections of this Code that would otherwise require means of egress to be kept unlocked.

18.1.1.1.6 Buildings, or sections of buildings, that house older persons and that provide activities that foster continued independence, but that do not include services distinctive to health care occupancies (*see 18.1.3*) as defined in 3.3.98 shall

be permitted to comply with the requirements of other chapters of this Code, such as Chapter 30 or Chapter 32.

18.1.1.1.7 Facilities that do not provide housing on a 24-hour basis for their occupants shall be classified as other occupancies and shall be covered by other chapters of this Code.

18.1.1.1.8* The requirements of this chapter are based on the assumption that staff is available in all patient-occupied areas to perform certain fire safety functions as required in other paragraphs of this chapter.

18.1.1.2* Goals and Objectives. The goals and objectives of Sections 4.1 and 4.2 shall be met with due consideration for functional requirements. This is accomplished by limiting the development and spread of a fire emergency to the room of fire origin and reducing the need for occupant evacuation, except from the room of fire origin.

18.1.1.3 Total Concept. All health care facilities shall be designed, constructed, maintained, and operated to minimize the possibility of a fire emergency requiring the evacuation of occupants. Because the safety of health care occupants cannot be ensured adequately by dependence on evacuation of the building, their protection from fire shall be provided by appropriate arrangement of facilities, adequate, trained staff, and development of operating and maintenance procedures composed of the following:

- (1) Design, construction, and compartmentation
- (2) Provision for detection, alarm, and extinguishment
- (3) Fire prevention and the planning, training, and drilling programs for the isolation of fire, transfer of occupants to areas of refuge, or evacuation of the building

18.1.1.4 Additions, Conversions, Modernization, Renovation, and Construction Operations.

18.1.1.4.1 Additions. Additions shall be separated from any existing structure not conforming to the provisions within Chapter 19 by a fire barrier having not less than a 2-hour fire resistance rating and constructed of materials as required for the addition. (*See 4.6.11 and 4.6.6.*)

18.1.1.4.2 Communicating openings in dividing fire barriers required by 18.1.1.4.1 shall be permitted only in corridors and shall be protected by approved self-closing fire doors. (*See also Section 8.2.*)

18.1.1.4.3 Doors in barriers required by 18.1.1.4.1 shall normally be kept closed.

Exception: Doors shall be permitted to be held open if they meet the requirements of 18.2.2.2.6.

18.1.1.4.4 Changes of Occupancy. Changes of occupancy shall comply with 4.6.11. A change from one health care occupancy subclassification to another shall require compliance with the requirements for new construction.

Exception No. 1: A change from a hospital to a nursing home or from a nursing home to a hospital shall not be considered a change in occupancy or occupancy subclassification.

Exception No. 2: A change from a hospital or nursing home to a limited care facility shall not be considered a change in occupancy or occupancy subclassification.

Exception No. 3: A change from a hospital or nursing home to an ambulatory health care facility shall not be considered a change in occupancy or occupancy subclassification.

18.1.1.4.5* Renovations, Alterations, and Modernizations.

Where major renovations, alterations, or modernizations are made in a nonsprinklered facility, the automatic sprinkler requirements of Chapter 18 shall apply to a smoke compartment undergoing the renovation, alteration, or modernization. However, in cases where the building is not protected throughout by an approved automatic sprinkler system, the requirements of 19.1.6 and 19.2.3.2 shall also apply. Exception No. 2 to 18.3.7.3 shall be permitted only where adjacent smoke compartments are protected throughout by an approved, supervised automatic sprinkler system in accordance with 18.3.5.2. Where minor renovations, alterations, modernizations, or repairs are done in a nonsprinklered facility, the requirements of 18.3.5.1 shall not apply but, in such cases, the renovations, alterations, modernizations, or repairs shall not reduce life safety below the level that previously existed, nor below the level of requirements of Chapter 19 for nonsprinklered buildings. (See 4.6.7.)

18.1.1.4.6 Construction, Repair, and Improvement Operations. (See 4.6.10.)

18.1.2 Mixed Occupancies. (See also 6.1.14.)

18.1.2.1* Sections of health care facilities shall be permitted to be classified as other occupancies, provided that they meet all of the following conditions:

- (1) They are not intended to serve health care occupants for purposes of housing, treatment, or customary access by patients incapable of self-preservation.
- (2) They are separated from areas of health care occupancies by construction having a fire resistance rating of not less than 2 hours.

18.1.2.2* Ambulatory care facilities, medical clinics, and similar facilities that are contiguous to health care occupancies but are primarily intended to provide outpatient services shall be permitted to be classified as business occupancies or ambulatory health care facilities, provided that the facilities are separated from the health care occupancy by not less than 2-hour fire resistance-rated construction and the facility is not intended to provide services simultaneously for four or more health care patients who are litterborne.

18.1.2.3 Health care occupancies in buildings housing other occupancies shall be completely separated from them by construction having a fire resistance rating of not less than 2 hours as provided for additions in 18.1.1.4.

18.1.2.4 All means of egress from health care occupancies that traverse non-health care spaces shall conform to the requirements of this Code for health care occupancies.

Exception: Exit through a horizontal exit into other contiguous occupancies that do not conform with health care egress provisions, but that do comply with requirements set forth in the appropriate occupancy chapter of this Code, shall be permitted, provided that the occupancy does not contain high hazard contents. The horizontal exit shall comply with the requirements of 18.2.2.5.

18.1.2.5 Egress provisions for areas of health care facilities that correspond to other occupancies shall meet the corresponding requirements of this Code for such occupancies. Where the clinical needs of the occupant necessitate the locking of means of egress, staff shall be present for the supervised release of occupants during all times of use.

18.1.2.6 Auditoriums, chapels, staff residential areas, or other occupancies provided in connection with health care facilities

shall have means of egress provided in accordance with other applicable sections of this Code.

18.1.2.7 Any area with a hazard of contents classified higher than that of the health care occupancy and located in the same building shall be protected as required in 18.3.2.

18.1.2.8 Non-health care-related occupancies classified as containing high hazard contents shall not be permitted in buildings housing health care occupancies.

18.1.3 Special Definitions.

Ambulatory Health Care Occupancy. See 3.3.8.

Hospital. See 3.3.104.

Limited Care Facility. See 3.3.117.

Nursing Home. See 3.3.132.

18.1.4 Classification of Occupancy. (See 18.1.3.)

18.1.5 Classification of Hazard of Contents. The classification of hazard of contents shall be as defined in Section 6.2.

18.1.6 Minimum Construction Requirements.

18.1.6.1 For the purpose of 18.1.6, the number of stories shall be counted starting with the primary level of exit discharge and ending with the highest occupiable level. For the purposes of 18.1.6, the primary level of exit discharge of a building shall be the lowest story whose floor is level with or above finished grade on the exterior wall line for 50 percent or more of its perimeter. Building levels below the primary level shall not be counted as a story.

18.1.6.2 Health care occupancies shall be limited to the types of building construction shown in Table 18.1.6.2. (See 8.2.1.)

Exception: Any building of Type I(443), Type I(332), Type II(222), or Type II(111) construction shall be permitted to include roofing systems involving combustible supports, decking, or roofing, provided that the following criteria are met:

(a) *The roof covering meets Class A requirements in accordance with NFPA 256, Standard Methods of Fire Tests of Roof Coverings.*

(b) *The roof is separated from all occupied portions of the building by a noncombustible floor assembly having not less than a 2-hour fire resistance rating that includes not less than 2 1/2 in. (6.4 cm) of concrete or gypsum fill. Structural elements supporting the 2-hour fire resistance-rated floor assembly shall be required to have only the fire resistance rating required of the building.*

Table 18.1.6.2 Construction Type Limitations

Construction Type	Stories			
	1	2	3	4 or More
I(443)	X	X	X	X
I(332)	X	X	X	X
II(222)	X	X	X	X
II(111)	X	X	X	NP
II(000)	X	NP	NP	NP
III(211)	X	NP	NP	NP
III(200)	NP	NP	NP	NP
IV(2HH)	X	NP	NP	NP
V(111)	X	NP	NP	NP
V(000)	NP	NP	NP	NP

X: Permitted type of construction.

NP: Not permitted.

18.1.6.3 All interior walls and partitions in buildings of Type I or Type II construction shall be of noncombustible or limited-combustible materials.

18.1.6.4 All buildings with more than one level below the level of exit discharge shall have all such lower levels separated from the level of exit discharge by not less than Type II(111) construction.

18.1.7 Occupant Load. The occupant load, in number of persons for whom means of egress and other provisions are required, shall be determined on the basis of the occupant load factors of Table 7.3.1.2 that are characteristic of the use of the space or shall be determined as the maximum probable population of the space under consideration, whichever is greater.

SECTION 18.2 MEANS OF EGRESS REQUIREMENTS

18.2.1 General. Every aisle, passageway, corridor, exit discharge, exit location, and access shall be in accordance with Chapter 7.

Exception: As modified by 18.2.2 through 18.2.11.

18.2.2* Means of Egress Components.

18.2.2.1 Components of means of egress shall be limited to the types described in 18.2.2.2 through 18.2.2.10.

18.2.2.2 Doors.

18.2.2.2.1 Doors complying with 7.2.1 shall be permitted.

18.2.2.2.2 Locks shall not be permitted on patient sleeping room doors.

Exception No. 1: Key-locking devices that restrict access to the room from the corridor and that are operable only by staff from the corridor side shall be permitted. Such devices shall not restrict egress from the room.

Exception No. 2: Door-locking arrangements shall be permitted in health care occupancies, or portions of health care occupancies, where the clinical needs of the patients require specialized security measures for their safety, provided that keys are carried by staff at all times.

18.2.2.2.3 Doors not located in a required means of egress shall be permitted to be subject to locking.

18.2.2.2.4 Doors within a required means of egress shall not be equipped with a latch or lock that requires the use of a tool or key from the egress side.

Exception No. 1: Door-locking arrangements without delayed egress shall be permitted in health care occupancies, or portions of health care occupancies, where the clinical needs of the patients require specialized security measures for their safety, provided that staff can readily unlock such doors at all times. (See 18.1.1.1.5 and 18.2.2.2.5.)

Exception No. 2: Delayed-egress locks complying with 7.2.1.6.1 shall be permitted, provided that not more than one such device is located in any egress path.*

Exception No. 3: Access-controlled egress doors complying with 7.2.1.6.2 shall be permitted.

18.2.2.2.5 Doors located in the means of egress that are permitted to be locked under other provisions of this chapter shall have adequate provisions made for the rapid removal of occupants by means such as remote control of locks, keying of all locks to keys carried by staff at all times, or other such reliable means available to the staff at all times. Only one such locking device shall be permitted on each door.

Exception: Locks in accordance with Exception Nos. 2 and 3 to 18.2.2.2.4.

18.2.2.2.6* Any door in an exit passageway, stairway enclosure, horizontal exit, smoke barrier, or hazardous area enclosure (except boiler rooms, heater rooms, and mechanical equipment rooms) shall be permitted to be held open only by an automatic release device that complies with 7.2.1.8.2. The automatic sprinkler system and the fire alarm system, and the systems required by 7.2.1.8.2 shall be arranged to initiate the closing action of all such doors throughout the smoke compartment or throughout the entire facility.

18.2.2.2.7 Where doors in a stair enclosure are held open by an automatic release device as permitted in 18.2.2.2.6, initiation of a door-closing action on any level shall cause all doors at all levels in the stair enclosure to close.

18.2.2.2.8 High-rise health care occupancies shall comply with the re-entry provisions of 7.2.1.5.2.

18.2.2.2.9 Horizontal sliding doors, as permitted by 7.2.1.14, that are not automatic-closing shall be limited to a single leaf and shall have a latch or other mechanism that ensures that doors will not rebound into a partially open position if forcefully closed in an emergency.

18.2.2.3 Stairs. Stairs complying with 7.2.2 shall be permitted.

18.2.2.4 Smokeproof Enclosures. Smokeproof enclosures complying with 7.2.3 shall be permitted.

18.2.2.5 Horizontal Exits. Horizontal exits complying with 7.2.4 and the modifications of 18.2.2.5.1 through 18.2.2.5.6 shall be permitted.

18.2.2.5.1 Not less than 30 net ft² (2.8 net m²) per patient in a hospital or nursing home, or not less than 15 net ft² (1.4 net m²) per resident in a limited care facility, shall be provided within the aggregated area of corridors, patient rooms, treatment rooms, lounge or dining areas, and other similar areas on each side of the horizontal exit. On stories not housing bed or litterborne patients, not less than 6 net ft² (0.56 net m²) per occupant shall be provided on each side of the horizontal exit for the total number of occupants in adjoining compartments.

18.2.2.5.2 The total egress capacity of the other exits (stairs, ramps, doors leading outside the building) shall not be reduced below one-third of that required for the entire area of the building.

18.2.2.5.3 A single door shall be permitted in a horizontal exit if the exit serves one direction only. Such door shall be a swinging door or a horizontal sliding door complying with 7.2.1.14. The door shall have not less than 41.5 in. (105 cm) in clear width.

18.2.2.5.4 A horizontal exit involving a corridor 8 ft (2.4 m) or more in width serving as a means of egress from both sides of the doorway shall have the opening protected by a pair of swinging doors arranged to swing in opposite directions from each other, with each door having a clear width of not less than 41.5 in. (105 cm), or by a horizontal sliding door complying with 7.2.1.14 that provides a clear width of not less than 83 in. (211 cm).

18.2.2.5.5 A horizontal exit involving a corridor 6 ft (1.8 m) or more in width serving as a means of egress from both sides of the doorway shall have the opening protected by a pair of

swinging doors, arranged to swing in opposite directions from each other, with each door having a clear width of not less than 32 in. (81 cm), or by a horizontal sliding door complying with 7.2.1.14 that provides a clear width of not less than 64 in. (163 cm).

18.2.2.5.6 An approved vision panel shall be required in each horizontal exit. Center mullions shall be prohibited.

18.2.2.6 Ramps.

18.2.2.6.1 Ramps complying with 7.2.5 shall be permitted.

18.2.2.6.2 Ramps enclosed as exits shall be of sufficient width to provide egress capacity in accordance with 18.2.3.2.

18.2.2.7 Exit Passageways. Exit passageways complying with 7.2.6 shall be permitted.

18.2.2.8 Fire Escape Ladders. Fire escape ladders complying with 7.2.9 shall be permitted.

18.2.2.9 Alternating Tread Devices. Alternating tread devices complying with 7.2.11 shall be permitted.

18.2.2.10 Areas of Refuge. Areas of refuge used as part of a required accessible means of egress shall comply with 7.2.12.

18.2.3 Capacity of Means of Egress.

18.2.3.1 The capacity of any required means of egress shall be based on its width, as defined in Section 7.3.

18.2.3.2 The capacity of means of egress providing travel by means of stairs shall be 0.3 in. (0.8 cm) per person, and the capacity of means of egress providing horizontal travel (without stairs) by means such as doors, ramps, or horizontal exits shall be 0.2 in. (0.5 cm) per person.

18.2.3.3* Aisles, corridors, and ramps required for exit access in a hospital or nursing home shall be not less than 8 ft (2.4 m) in clear and unobstructed width. Where ramps are used as exits, see 18.2.2.6.

*Exception No. 1:** Aisles, corridors, and ramps in adjunct areas not intended for the housing, treatment, or use of inpatients shall be not less than 44 in. (112 cm) in clear and unobstructed width.

*Exception No. 2:** Exit access within a room or suite of rooms complying with the requirements of 18.2.5.

18.2.3.4 Aisles, corridors, and ramps required for exit access in a limited care facility or hospital for psychiatric care shall be not less than 6 ft (1.8 m) in clear and unobstructed width. Where ramps are used as exits, see 18.2.2.6.

*Exception No. 1:** Aisles, corridors, and ramps in adjunct areas not intended for the housing, treatment, or use of inpatients shall be not less than 44 in. (112 cm) in clear and unobstructed width.

*Exception No. 2:** Exit access within a room or suite of rooms complying with the requirements of 18.2.5.

18.2.3.5 The minimum clear width for doors in the means of egress from sleeping rooms; diagnostic and treatment areas, such as x-ray, surgery, or physical therapy; and nursery rooms shall be as follows:

- (1) Hospitals and nursing homes — 41.5 in. (105 cm)
- (2) Psychiatric hospitals and limited care facilities — 32 in. (81 cm)

Exception No. 1: Doors that are located so as not to be subject to use by any health care occupant shall be not less than 32 in. (81 cm) in clear width.

Exception No. 2: Doors in exit stair enclosures shall be not less than 32 in. (81 cm) in clear width.

Exception No. 3: Doors serving newborn nurseries shall be not less than 32 in. (81 cm) in clear width.

Exception No. 4: Where a pair of doors is provided, not less than one of the doors shall provide not less than a 32-in. (81-cm) clear width opening and a rabbet, bevel, or astragal shall be provided at the meeting edge. The inactive leaf shall have an automatic flush bolt to provide positive latching.

18.2.4 Number of Exits.

18.2.4.1 Not less than two exits of the types described in 18.2.2.2 through 18.2.2.10, remotely located from each other, shall be provided for each floor or fire section of the building.

18.2.4.2 Not less than one exit from each floor or fire section shall be one of the following:

- (1) A door leading directly outside the building
- (2) A stair
- (3) A smokeproof enclosure
- (4) A ramp
- (5) An exit passageway

Any fire section not meeting these requirements shall be considered part of an adjoining zone. Egress shall not require return through the zone of fire origin.

18.2.4.3* Not less than two exits of the types described in 18.2.2.2 through 18.2.2.10 shall be accessible from each smoke compartment. Egress shall be permitted through an adjacent compartment(s) but shall not require return through the compartment of fire origin.

18.2.5 Arrangement of Means of Egress.

18.2.5.1 Every habitable room shall have an exit access door leading directly to an exit access corridor.

Exception No. 1: If there is an exit door opening directly to the outside from the room at ground level.

Exception No. 2: Exit access from a patient sleeping room with not more than eight patient beds shall be permitted to pass through one intervening room to reach the exit access corridor.

Exception No. 3: Exit access from a special nursing suite shall be permitted to pass through one intervening room to reach the exit access corridor where the arrangement allows for direct and constant visual supervision by nursing personnel.

Exception No. 4: Exit access from a suite of rooms, other than patient sleeping rooms, shall be permitted to pass through not more than two adjacent rooms to reach the exit access corridor where the travel distance within the suite is in accordance with 18.2.5.8.

18.2.5.2 Any patient sleeping room, or any suite that includes patient sleeping rooms, of more than 1000 ft² (93 m²) shall have not less than two exit access doors remotely located from each other.

18.2.5.3 Any room or any suite of rooms, other than patient sleeping rooms, of more than 2500 ft² (230 m²) shall have not less than two exit access doors remotely located from each other.

18.2.5.4 Any suite of rooms that complies with the requirements of 18.2.5 shall be permitted to be subdivided with non-fire-rated, noncombustible, or limited-combustible partitions.

18.2.5.5 Intervening rooms shall not be hazardous areas as defined by 18.3.2.

18.2.5.6 Suites of sleeping rooms shall not exceed 5000 ft² (460 m²).

18.2.5.7 Suites of rooms, other than patient sleeping rooms, shall not exceed 10,000 ft² (930 m²).

18.2.5.8 Suites of rooms, other than patient sleeping rooms, shall be permitted to have one intervening room if the travel distance within the suite to the exit access door does not exceed 100 ft (30 m) and shall be permitted to have two intervening rooms where the travel distance within the suite to the exit access door does not exceed 50 ft (15 m).

18.2.5.9 Every corridor shall provide access to not less than two approved exits in accordance with Sections 7.4 and 7.5 without passing through any intervening rooms or spaces other than corridors or lobbies.

18.2.5.10 Every exit or exit access shall be arranged so that no corridor, aisle, or passageway has a pocket or dead end exceeding 30 ft (9.1 m).

18.2.6 Travel Distance to Exits.

18.2.6.1 Travel distance shall be measured in accordance with Section 7.6.

18.2.6.2 Travel distance shall comply with 18.2.6.2.1 through 18.2.6.2.4.

18.2.6.2.1 The travel distance between any room door required as an exit access and an exit shall not exceed 150 ft (45 m).

18.2.6.2.2 The travel distance between any point in a room and an exit shall not exceed 200 ft (60 m).

18.2.6.2.3 The travel distance between any point in a health care sleeping room and an exit access door in that room shall not exceed 50 ft (15 m).

18.2.6.2.4 The travel distance between any point in a suite of sleeping rooms as permitted by 18.2.5 and an exit access door of that suite shall not exceed 100 ft (30 m) and shall meet the requirements of 18.2.6.2.2.

18.2.7 Discharge from Exits. Discharge from exits shall be arranged in accordance with Section 7.7.

18.2.8 Illumination of Means of Egress. Means of egress shall be illuminated in accordance with Section 7.8.

18.2.9 Emergency Lighting.

18.2.9.1 Emergency lighting shall be provided in accordance with Section 7.9.

18.2.9.2 Buildings equipped with or in which patients require the use of life-support systems (*see 18.5.1.3*) shall have emergency lighting equipment supplied by the life safety branch of the electrical system as described in NFPA 99, *Standard for Health Care Facilities*.

18.2.10 Marking of Means of Egress.

18.2.10.1 Means of egress shall have signs in accordance with Section 7.10.

18.2.10.2 Buildings equipped with or in which patients require the use of life-support systems (*see 18.5.1.3*) shall have illumination of the required exit and directional signs supplied by the life safety branch of the electrical system as described in NFPA 99, *Standard for Health Care Facilities*.

Exception: Self-luminous exit signs as permitted by 7.10.4.

18.2.11 Special Means of Egress Features. (Reserved.)

SECTION 18.3 PROTECTION

18.3.1 Protection of Vertical Openings.

18.3.1.1 Any vertical opening shall be enclosed or protected in accordance with 8.2.5.

Exception No. 1: Unprotected vertical openings in accordance with 8.2.5.8 shall be permitted.

Exception No. 2: Exception No. 1 to 8.2.5.6(1) shall not apply to patient sleeping and treatment rooms.

Exception No. 3: Multilevel patient sleeping areas in psychiatric facilities shall be permitted without enclosure protection between levels, provided that all the following conditions are met:

(a) *The entire normally occupied area, including all communicating floor levels, is sufficiently open and unobstructed so that a fire or other dangerous condition in any part shall be obvious to the occupants or supervisory personnel in the area.*

(b) *Egress capacity is sufficient to provide simultaneously for all the occupants of all communicating levels and areas, with all communicating levels in the same fire area being considered as a single floor area for purposes of determination of required egress capacity.*

(c) *The height between the highest and lowest finished floor levels shall not exceed 13 ft (4 m); the number of levels shall not be restricted.*

Exception No. 4: Unprotected openings in accordance with 8.2.5.5 shall not be permitted.

18.3.1.2 A door in a stair enclosure shall be self-closing and shall normally be kept in the closed position.

Exception: Doors in stair enclosures held open under the conditions specified by 18.2.2.2.6 and 18.2.2.2.7.

18.3.2 Protection from Hazards.

18.3.2.1* Hazardous Areas. Any hazardous area shall be protected in accordance with Section 8.4. The areas described in Table 18.3.2.1 shall be protected as indicated.

18.3.2.2* Laboratories. Laboratories employing quantities of flammable, combustible, or hazardous materials that are considered as a severe hazard shall be protected in accordance with NFPA 99, *Standard for Health Care Facilities*.

18.3.2.3 Anesthetizing Locations. Anesthetizing locations shall be protected in accordance with NFPA 99, *Standard for Health Care Facilities*.

18.3.2.4 Medical Gas. Medical gas storage and administration areas shall be protected in accordance with NFPA 99, *Standard for Health Care Facilities*.

18.3.2.5 Gift Shops. Gift shops shall be protected as hazardous areas where used for the storage or display of combustibles in quantities considered hazardous. Gift shops not considered hazardous and having separately protected storage shall be permitted to be as follows:

- (1) Open to a lobby or corridor if the gift shop does not exceed 500 ft² (46.5 m²)
- (2) Separated from a lobby or corridor with non-fire-rated walls

Table 18.3.2.1 Hazardous Area Protection

Hazardous Area Description	Separation/Protection
Boiler and fuel-fired heater rooms	1 hour
Central/bulk laundries larger than 100 ft ² (9.3 m ²)	1 hour
Laboratories employing flammable or combustible materials in quantities less than those that would be considered a severe hazard	See 18.3.6.3.4
Laboratories that use hazardous materials that would be classified as a severe hazard in accordance with NFPA 99, <i>Standard for Health Care Facilities</i>	1 hour
Paint shops employing hazardous substances and materials in quantities less than those that would be classified as a severe hazard	1 hour
Physical plant maintenance shops	1 hour
Soiled linen rooms	1 hour
Storage rooms larger than 50 ft ² (4.6 m ²) but not exceeding 100 ft ² (9.3 m ²) storing combustible material	See 18.3.6.3.4
Storage rooms larger than 100 ft ² (9.3 m ²) storing combustible material	1 hour
Trash collection rooms	1 hour

18.3.2.6 Cooking Facilities. Cooking facilities shall be protected in accordance with 9.2.3.

*Exception:** Where domestic cooking equipment is used for food-warming or limited cooking, protection or segregation of food preparation facilities shall not be required.

18.3.2.7 Buildings housing health care occupancies as indicated in 18.1.1.1.2 that have rooftop heliports shall be protected in accordance with NFPA 418, *Standard for Heliports*.

18.3.3 Interior Finish.

18.3.3.1 Interior finish shall be in accordance with Section 10.2.

18.3.3.2 Interior Wall and Ceiling Finish. Interior wall and ceiling finish materials complying with 10.2.3 shall be permitted throughout if Class A or Class B. The provisions of 10.2.8.1 shall not apply.

Exception No. 1: Walls and ceilings shall be permitted to have Class A, Class B, or Class C interior finish in individual rooms having a capacity not exceeding four persons.

Exception No. 2: Corridor wall finish not exceeding 4 ft (1.2 m) in height that is restricted to the lower half of the wall shall be permitted to be Class A, Class B, or Class C.

18.3.3.3 Interior Floor Finish. (No requirements.)

18.3.4 Detection, Alarm, and Communications Systems.

18.3.4.1 General. Health care occupancies shall be provided with a fire alarm system in accordance with Section 9.6.

18.3.4.2* Initiation. Initiation of the required fire alarm systems shall be by manual means in accordance with 9.6.2 and by means of any required sprinkler system waterflow alarms, detection devices, or detection systems.

Exception: Manual fire alarm boxes in patient sleeping areas shall not be required at exits if located at all nurses' control stations or other continuously attended staff location, provided that such manual fire alarm boxes are visible and continuously accessible and that travel distances required by 9.6.2.4 are not exceeded.

18.3.4.3 Notification.

18.3.4.3.1 Occupant Notification. Occupant notification shall be accomplished automatically in accordance with 9.6.3. Exception No. 3 to 9.6.3.2 shall be prohibited.

*Exception:** In lieu of audible alarm signals, visible alarm-indicating appliances shall be permitted to be used in critical care areas.

18.3.4.3.2 Emergency Forces Notification. Fire department notification shall be accomplished in accordance with 9.6.4.

Exception: Smoke detection devices or smoke detection systems equipped with reconfirmation features shall not be required to automatically notify the fire department unless the alarm condition is reconfirmed after a period not exceeding 120 seconds.

18.3.4.3.3 Alarm annunciation shall be provided in accordance with 9.6.7.

Exception: The alarm zone shall be permitted to coincide with the permitted area for smoke compartments.

18.3.4.4 Emergency Control. Operation of any activating device in the required fire alarm system shall be arranged to accomplish automatically any control functions to be performed by that device. (See 9.6.5.)

18.3.4.5 Detection.

18.3.4.5.1 Detection systems, where required, shall be in accordance with Section 9.6.

18.3.4.5.2 Detection in Spaces Open to Corridors. (See 18.3.6.1.)

18.3.4.5.3* Nursing Homes. An approved automatic smoke detection system shall be installed in corridors throughout smoke compartments containing patient sleeping rooms and in spaces open to corridors as permitted in nursing homes by 18.3.6.1.

Exception No. 1: Corridor systems shall not be required where each patient sleeping room is protected by an approved smoke detection system.

Exception No. 2: Corridor systems shall not be required where patient room doors are equipped with automatic door-closing devices with integral smoke detectors on the room side installed in accordance with their listing, provided that the integral detectors provide occupant notification.

18.3.5 Extinguishment Requirements.

18.3.5.1* Buildings containing health care facilities shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

Exception: In Type I and Type II construction, where approved by the authority having jurisdiction, alternative protection measures shall be permitted to be substituted for sprinkler protection in specified areas where the authority having jurisdiction has prohibited sprinklers, without causing a building to be classified as nonsprinklered.

18.3.5.2* Listed quick-response or listed residential sprinklers shall be used throughout smoke compartments containing patient sleeping rooms.

18.3.5.3 (Reserved.)

18.3.5.4 (Reserved.)

18.3.5.5* Sprinklers in areas where cubicle curtains are installed shall be in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*.

18.3.5.6 Portable fire extinguishers shall be provided in all health care occupancies in accordance with 9.7.4.1.

18.3.6 Corridors.

18.3.6.1 Corridors shall be separated from all other areas by partitions complying with 18.3.6.2 through 18.3.6.5. (See also 18.2.5.9.)

Exception No. 1: Spaces shall be permitted to be unlimited in area and open to the corridor, provided that the following criteria are met:

(a) *The spaces are not used for patient sleeping rooms, treatment rooms, or hazardous areas.*

(b) *The corridors onto which the spaces open in the same smoke compartment are protected by an electrically supervised automatic smoke detection system in accordance with 18.3.4, or the smoke compartment in which the space is located is protected throughout by quick-response sprinklers.*

(c) *The open space is protected by an electrically supervised automatic smoke detection system in accordance with 18.3.4, or the entire space is arranged and located to allow direct supervision by the facility staff from a nurses' station or similar space.*

(d) *The space does not obstruct access to required exits.*

Exception No. 2: Waiting areas shall be permitted to be open to the corridor, provided that the following criteria are met:

(a) *The aggregate waiting area in each smoke compartment does not exceed 600 ft² (55.7 m²).*

(b) *Each area is protected by an electrically supervised automatic smoke detection system in accordance with 18.3.4, or each area is arranged and located to allow direct supervision by the facility staff from a nursing station or similar space.*

(c) *The area does not obstruct access to required exits.*

Exception No. 3: Spaces for nurses' stations.*

Exception No. 4: Gift shops open to the corridor where protected in accordance with 18.3.2.5.

Exception No. 5: In a limited care facility, group meeting or multipurpose therapeutic spaces shall be permitted to open to the corridor, provided that the following criteria are met:

(a) *The space is not a hazardous area.*

(b) *The space is protected by an electrically supervised automatic smoke detection system in accordance with 18.3.4, or the space is arranged and located to allow direct supervision by the facility staff from the nurses' station or similar location.*

(c) *The area does not obstruct access to required exits.*

18.3.6.2* Construction of Corridor Walls. Corridor walls shall form a barrier to limit the transfer of smoke. Such walls shall be permitted to terminate at the ceiling where the ceiling is constructed to limit the transfer of smoke. No fire resistance rating is required for corridor walls.

18.3.6.3* Corridor Doors.

18.3.6.3.1* Doors protecting corridor openings shall be constructed to resist the passage of smoke. Compliance with NFPA 80, *Standard for Fire Doors and Fire Windows*, shall not be required. Clearance between the bottom of the door and the

floor covering not exceeding 1 in. (2.5 cm) shall be permitted for corridor doors.

Exception: Doors to toilet rooms, bathrooms, shower rooms, sink closets, and similar auxiliary spaces that do not contain flammable or combustible materials.

18.3.6.3.2 Doors shall be provided with positive latching hardware. Roller latches shall be prohibited.

Exception: Doors to toilet rooms, bathrooms, shower rooms, sink closets, and similar auxiliary spaces that do not contain flammable or combustible materials.

18.3.6.3.3* Hold-open devices that release when the door is pushed or pulled shall be permitted.

18.3.6.3.4 Door-closing devices shall not be required on doors in corridor wall openings other than those serving required exits, smoke barriers, or enclosures of vertical openings and hazardous areas.

18.3.6.3.5 Nonrated, factory- or field-applied protective plates extending not more than 48 in. (122 cm) above the bottom of the door shall be permitted.

18.3.6.3.6 Dutch doors shall be permitted where they conform to 18.3.6.3. In addition, both the upper leaf and lower leaf shall be equipped with a latching device, and the meeting edges of the upper and lower leaves shall be equipped with an astragal, a rabbit, or a bevel.

Dutch doors protecting openings in enclosures around hazardous areas shall comply with NFPA 80, *Standard for Fire Doors and Fire Windows*.

18.3.6.4 Transfer Grilles. Transfer grilles, regardless of whether they are protected by fusible link-operated dampers, shall not be used in these walls or doors.

Exception: Doors to toilet rooms, bathrooms, shower rooms, sink closets, and similar auxiliary spaces that do not contain flammable or combustible materials shall be permitted to have ventilating louvers or to be undercut.

18.3.6.5 Openings. In other than smoke compartments containing patient bedrooms, miscellaneous openings such as mail slots, pharmacy pass-through windows, laboratory pass-through windows, and cashier pass-through windows shall be permitted to be installed in vision panels or doors without special protection, provided that the aggregate area of openings per room does not exceed 80 in.² (520 cm²) and the openings are installed at or below half the distance from the floor to the room ceiling.

18.3.7* Subdivision of Building Spaces.

18.3.7.1 Buildings containing health care facilities shall be subdivided by smoke barriers as follows:

- (1) To divide every story used by inpatients for sleeping or treatment into not less than two smoke compartments
- (2) To divide every story having an occupant load of 50 or more persons, regardless of use, into not less than two smoke compartments
- (3) To limit the size of each smoke compartment required by (1) and (2) to an area not exceeding 22,500 ft² (2100 m²)

Exception: The area of an atrium separated in accordance with 8.2.5.6 shall not be limited in size.

- (4) To limit the travel distance from any point to reach a door in the required smoke barrier to a distance not exceeding 200 ft (60 m).

Exception No. 1: Stories that do not contain a health care occupancy, located totally above the health care occupancy.

Exception No. 2: Areas that do not contain a health care occupancy and that are separated from the health care occupancy by a fire barrier complying with 7.2.4.3.

Exception No. 3: Stories that do not contain health care occupancies and that are more than one story below the health care occupancy.

Exception No. 4: Open-air parking structures protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

18.3.7.2 Smoke barriers shall be provided on stories that are usable but unoccupied.

18.3.7.3 Any required smoke barrier shall be constructed in accordance with Section 8.3 and shall have a fire resistance rating of not less than 1 hour.

Exception No. 1: Where an atrium is used, smoke barriers shall be permitted to terminate at an atrium wall constructed in accordance with Exception No. 2 to 8.2.5.6(1). Not less than two separate smoke compartments shall be provided on each floor.

Exception No. 2: Dampers shall not be required in duct penetrations of smoke barriers in fully ducted heating, ventilating, and air conditioning systems.*

18.3.7.4 Not less than 30 net ft² (2.8 net m²) per patient in a hospital or nursing home, or not less than 15 net ft² (1.4 net m²) per resident in a limited care facility, shall be provided within the aggregate area of corridors, patient rooms, treatment rooms, lounge or dining areas, and other low hazard areas on each side of the smoke barrier. On stories not housing bed or litterborne patients, not less than 6 net ft² (0.56 net m²) per occupant shall be provided on each side of the smoke barrier for the total number of occupants in adjoining compartments.

18.3.7.5* Doors in smoke barriers shall be substantial doors, such as 1³/₄-in. (4.4-cm) thick, solid-bonded wood core doors, or shall be of construction that resists fire for not less than 20 minutes. Nonrated factory- or field-applied protective plates extending not more than 48 in. (122 cm) above the bottom of the door shall be permitted. Cross-corridor openings in smoke barriers shall be protected by a pair of swinging doors or a horizontal sliding door complying with 7.2.1.14. Swinging doors shall be arranged so that each door swings in a direction opposite from the other.

The minimum clear width for swinging doors shall be as follows:

- (1) Hospitals and nursing homes — 41.5 in. (105 cm)
- (2) Psychiatric hospitals and limited care facilities — 32 in. (81 cm)

The minimum clear width opening for horizontal sliding doors shall be as follows:

- (1) Hospitals and nursing homes — 83 in. (211 cm)
- (2) Psychiatric hospitals and limited care facilities — 64 in. (163 cm)

18.3.7.6* Doors in smoke barriers shall comply with 8.3.4 and shall be self-closing or automatic-closing in accordance with 18.2.2.2.6.

18.3.7.7* Vision panels consisting of fire-rated glazing or wire glass panels in approved frames shall be provided in each cross-corridor swinging door and at each cross-corridor horizontal sliding door in a smoke barrier.

18.3.7.8 Rabbets, bevels, or astragals shall be required at the meeting edges, and stops shall be required at the head and sides of door frames in smoke barriers. Positive latching hardware shall not be required. Center mullions shall be prohibited.

18.3.8* Special Protection Features — Outside Window or Door. Every patient sleeping room shall have an outside window or outside door. The allowable sill height shall not exceed 36 in. (91 cm) above the floor.

Exception No. 1: Newborn nurseries and rooms intended for occupancy for less than 24 hours, such as those housing obstetrical labor beds, recovery beds, and observation beds in the emergency department.

Exception No. 2: Windows in atrium walls shall be considered outside windows for the purposes of this requirement.

Exception No. 3: The window sill in special nursing care areas, such as those housing ICU, CCU, hemodialysis, and neonatal patients, shall not exceed 60 in. (152 cm) above the floor.

Exception No. 4: The window sill in limited care facilities shall not exceed 44 in. (112 cm) above the floor.

SECTION 18.4 SPECIAL PROVISIONS

18.4.1 Windowless Buildings. Windowless buildings or windowless portions of buildings shall not be used for patient sleeping rooms. Windowless buildings or windowless portions of buildings shall comply with Section 11.7.

18.4.2 High-Rise Buildings. High-rise buildings shall comply with Section 11.8.

SECTION 18.5 BUILDING SERVICES

18.5.1 Utilities.

18.5.1.1 Utilities shall comply with the provisions of Section 9.1.

18.5.1.2 Power for alarms, emergency communication systems, and illumination of generator set locations shall be in accordance with the essential electrical system requirements of NFPA 99, *Standard for Health Care Facilities*.

18.5.1.3 Any health care occupancy, as indicated in 18.1.1.1.2, that normally uses life-support devices shall have electrical systems designed and installed in accordance with NFPA 99, *Standard for Health Care Facilities*.

Exception: This requirement shall not apply to a facility that uses life-support equipment for emergency purposes only.

18.5.2 Heating, Ventilating, and Air Conditioning.

18.5.2.1 Heating, ventilating, and air conditioning shall comply with the provisions of Section 9.2 and shall be installed in accordance with the manufacturer's specifications.

Exception: As modified in 18.5.2.2.

18.5.2.2* Any heating device other than a central heating plant shall be designed and installed so that combustible material will not be ignited by the device or its appurtenances. If fuel-fired, such heating devices shall be chimney connected or vent connected, shall take air for combustion directly from outside, and shall be designed and installed to provide for complete separation of the combustion system from the atmosphere of the occupied area. Any heating device shall have safety features to immediately stop the flow of fuel and shut down the equipment in case of either excessive temperatures or ignition failure.

Exception No. 1: Approved, suspended unit heaters shall be permitted in locations other than means of egress and patient sleeping areas, provided that such heaters are located high enough to be out of the reach of persons using the area and are equipped with the safety features required by 18.5.2.2.

Exception No. 2: Fireplaces shall be permitted and used only in areas other than patient sleeping areas, provided that such areas are separated from patient sleeping spaces by construction having not less than a 1-hour fire resistance rating and that such fireplaces comply with the provisions of 9.2.2. In addition, the fireplace shall be equipped with a hearth that shall be raised not less than 4 in. (10.2 cm) and a fireplace enclosure guaranteed against breakage up to a temperature of 650°F (343°C) and constructed of heat-tempered glass or other approved material. If, in the opinion of the authority having jurisdiction, special hazards are present, a lock on the enclosure and other safety precautions shall be permitted to be required.

18.5.3 Elevators, Escalators, and Conveyors. Elevators, escalators, and conveyors shall comply with the provisions of Section 9.4.

18.5.4 Rubbish Chutes, Incinerators, and Laundry Chutes.

18.5.4.1 Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 9.5.

18.5.4.2 Any rubbish chute or linen chute, including pneumatic rubbish and linen systems, shall be provided with automatic extinguishing protection in accordance with Section 9.7. (*See Section 9.5.*)

18.5.4.3 Any trash chute shall discharge into a trash collection room used for no other purpose and protected in accordance with Section 8.4.

18.5.4.4 Incinerators shall not be directly flue-fed, nor shall any floor charging chute directly connect with the combustion chamber.

SECTION 18.6 RESERVED

SECTION 18.7* OPERATING FEATURES

18.7.1 Evacuation and Relocation Plan and Fire Drills.

18.7.1.1 The administration of every health care occupancy shall have, in effect and available to all supervisory personnel, written copies of a plan for the protection of all persons in the event of fire, for their evacuation to areas of refuge, and for their evacuation from the building when necessary. All employees shall be periodically instructed and kept informed with respect to their duties under the plan. A copy of the plan shall be readily available at all times in the telephone operator's position or at the security center.

The provisions of 18.7.1.2 through 18.7.2.3 shall apply.

18.7.1.2* Fire drills in health care occupancies shall include the transmission of a fire alarm signal and simulation of emergency fire conditions. Drills shall be conducted quarterly on each shift to familiarize facility personnel (nurses, interns, maintenance engineers, and administrative staff) with the signals and emergency action required under varied conditions. When drills are conducted between 9:00 p.m. (2100 hours) and 6:00 a.m. (0600 hours), a coded announcement shall be permitted to be used instead of audible alarms.

Exception: Infirm or bedridden patients shall not be required to be moved during drills to safe areas or to the exterior of the building.

18.7.1.3 Employees of health care occupancies shall be instructed in life safety procedures and devices.

18.7.2 Procedure in Case of Fire.

18.7.2.1* For health care occupancies, the proper protection of patients shall require the prompt and effective response of health care personnel. The basic response required of staff shall include the removal of all occupants directly involved with the fire emergency, transmission of an appropriate fire alarm signal to warn other building occupants and summon staff, confinement of the effects of the fire by closing doors to isolate the fire area, and the relocation of patients as detailed in the health care occupancy's fire safety plan.

18.7.2.2 A written health care occupancy fire safety plan shall provide for the following:

- (1) Use of alarms
- (2) Transmission of alarm to fire department
- (3) Response to alarms
- (4) Isolation of fire
- (5) Evacuation of immediate area
- (6) Evacuation of smoke compartment
- (7) Preparation of floors and building for evacuation
- (8) Extinguishment of fire

18.7.2.3 All health care occupancy personnel shall be instructed in the use of and response to fire alarms. In addition, they shall be instructed in the use of the code phrase to ensure transmission of an alarm under the following conditions:

- (1) When the individual who discovers a fire must immediately go to the aid of an endangered person
- (2) During a malfunction of the building fire alarm system

Personnel hearing the code announced shall first activate the building fire alarm using the nearest manual fire alarm box and then shall execute immediately their duties as outlined in the fire safety plan.

18.7.3 Maintenance of Exits. Proper maintenance shall be provided to ensure the dependability of the method of evacuation selected. Health care occupancies that find it necessary to lock exits shall, at all times, maintain an adequate staff qualified to release locks and direct occupants from the immediate danger area to a place of safety in case of fire or other emergency.

18.7.4* Smoking. Smoking regulations shall be adopted and shall include not less than the following provisions:

- (1) Smoking shall be prohibited in any room, ward, or compartment where flammable liquids, combustible gases, or oxygen is used or stored and in any other hazardous location, and such areas shall be posted with signs that read NO SMOKING or shall be posted with the international symbol for no smoking.

Exception: In health care occupancies where smoking is prohibited and signs are prominently placed at all major entrances, secondary signs with language that prohibits smoking shall not be required.

- (2) Smoking by patients classified as not responsible shall be prohibited.

Exception: The requirement of 18.7.4(2) shall not apply where the patient is under direct supervision.

- (3) Ashtrays of noncombustible material and safe design shall be provided in all areas where smoking is permitted.

- (4) Metal containers with self-closing cover devices into which ashtrays can be emptied shall be readily available to all areas where smoking is permitted.

18.7.5 Furnishings, Bedding, and Decorations.

18.7.5.1* Draperies, curtains, including cubicle curtains, and other loosely hanging fabrics and films serving as furnishings or decorations in health care occupancies shall be in accordance with the provisions of 10.3.1. (See 18.3.5.5.)

Exception: Curtains at showers.

18.7.5.2 Newly introduced upholstered furniture within health care occupancies shall meet the criteria specified when tested in accordance with the methods cited in 10.3.2(2) and 10.3.3.

18.7.5.3 Newly introduced mattresses within health care occupancies shall meet the criteria specified when tested in accordance with the methods cited in 10.3.2(3) and 10.3.4.

18.7.5.4 Combustible decorations shall be prohibited in any health care occupancy unless they are flame-retardant.

Exception: Combustible decorations, such as photographs and paintings, in such limited quantities that a hazard of fire development or spread is not present.

18.7.5.5 Soiled linen or trash collection receptacles shall not exceed 32 gal (121 L) in capacity. The average density of container capacity in a room or space shall not exceed 0.5 gal/ft² (20.4 L/m²). A capacity of 32 gal (121 L) shall not be exceeded within any 64-ft² (5.9-m²) area. Mobile soiled linen or trash collection receptacles with capacities greater than 32

gal (121 L) shall be located in a room protected as a hazardous area when not attended.

Exception: Container size and density shall not be limited in hazardous areas.

18.7.6 Maintenance and Testing. (See 4.6.12.)

18.7.7* Engineered Smoke Control Systems. New engineered smoke control systems shall be tested in accordance with established engineering principles and shall meet the performance requirements of such testing prior to acceptance. Following acceptance, all engineered smoke control systems shall be tested periodically in accordance with recognized engineering principles. Test documentation shall be maintained on the premises at all times.

18.7.8 Portable Space-Heating Devices. Portable space-heating devices shall be prohibited in all health care occupancies.

Exception: Portable space-heating devices shall be permitted to be used in nonsleeping staff and employee areas where the heating elements of such devices do not exceed 212°F (100°C).

18.7.9 Construction, Repair, and Improvement Operations.

18.7.9.1 Construction, repair, and improvement operations shall comply with 4.6.10.

18.7.9.2 The means of egress in any area undergoing construction, repair, or improvements shall be inspected daily for compliance with 7.1.10.1 and shall also comply with NFPA 241, *Standard for Safeguarding Construction, Alteration, and Demolition Operations*.

Chapter 19 EXISTING HEALTH CARE OCCUPANCIES

SECTION 19.1 GENERAL REQUIREMENTS

19.1.1 Application.

19.1.1.1 General.

19.1.1.1.1 The requirements of this chapter apply to existing buildings or portions thereof currently occupied as health care occupancies. (See also 18.1.1.1.1.)

*Exception:** Facilities where the authority having jurisdiction has determined equivalent safety has been provided in accordance with Section 1.5.

19.1.1.1.2 This chapter establishes life safety requirements for all existing hospitals, nursing homes, and limited care facilities. The term *hospital*, wherever used in this *Code*, shall include general hospitals, psychiatric hospitals, and specialty hospitals. The term *nursing home*, wherever used in this *Code*, shall include nursing and convalescent homes, skilled nursing facilities, intermediate care facilities, and infirmaries in homes for the aged. Where requirements vary, the specific subclass of health care occupancy is named in the paragraph pertaining thereto. Chapter 21 establishes life safety requirements for all existing ambulatory health care facilities. Section 19.7 establishes operating features requirements for all health care occupancies.

19.1.1.1.3 Health care facilities regulated by this chapter provide sleeping accommodations for their occupants and are occupied by persons who are mostly incapable of self-preservation because of age, because of physical or mental disability, or because of security measures not under the occupants' control.

19.1.1.1.4 Buildings, or sections of buildings, that primarily house patients who, in the opinion of the governing body of the facility and the governmental agency having jurisdiction, are capable of judgment and appropriate physical action for self-preservation under emergency conditions shall be permitted to comply with chapters of the *Code* other than Chapter 19.

19.1.1.1.5 It shall be recognized that, in buildings housing certain types of patients or having detention rooms or a security section, it might be necessary to lock doors and bar windows to confine and protect building inhabitants. In such instances, the authority having jurisdiction shall make appropriate modifications to those sections of this *Code* that would otherwise require means of egress to be kept unlocked.

19.1.1.1.6 Buildings, or sections of buildings, that house older persons and that provide activities that foster continued independence, but that do not include services distinctive to health care occupancies (see 19.1.3) as defined in 3.3.98 shall be permitted to comply with the requirements of other chapters of this *Code*, such as Chapter 31 or Chapter 33.

19.1.1.1.7 Facilities that do not provide housing on a 24-hour basis for their occupants shall be classified as other occupancies and shall be covered by other chapters of this *Code*.

19.1.1.1.8* The requirements of this chapter are based on the assumption that staff is available in all patient-occupied areas to perform certain fire safety functions as required in other paragraphs of this chapter.

19.1.1.2* Goals and Objectives. The goals and objectives of Sections 4.1 and 4.2 shall be met with due consideration for

functional requirements. This is accomplished by limiting the development and spread of a fire emergency to the room of fire origin and reducing the need for occupant evacuation, except from the room of fire origin.

19.1.1.3 Total Concept. All health care facilities shall be designed, constructed, maintained, and operated to minimize the possibility of a fire emergency requiring the evacuation of occupants. Because the safety of health care occupants cannot be ensured adequately by dependence on evacuation of the building, their protection from fire shall be provided by appropriate arrangement of facilities, adequate staffing, and development of operating and maintenance procedures composed of the following:

- (1) Design, construction, and compartmentation
- (2) Provision for detection, alarm, and extinguishment
- (3) Fire prevention and the planning, training, and drilling programs for the isolation of fire, transfer of occupants to areas of refuge, or evacuation of the building

19.1.1.4 Additions, Conversions, Modernization, Renovation, and Construction Operations.

19.1.1.4.1 Additions. Additions shall be separated from any existing structure not conforming to the provisions within Chapter 19 by a fire barrier having not less than a 2-hour fire resistance rating and constructed of materials as required for the addition. (See 4.6.11 and 4.6.6.)

19.1.1.4.2 Communicating openings in dividing fire barriers required by 19.1.1.4.1 shall be permitted only in corridors and shall be protected by approved self-closing fire doors. (See also Section 8.2.)

19.1.1.4.3 Doors in barriers required by 19.1.1.4.1 shall normally be kept closed.

Exception: Doors shall be permitted to be held open if they meet the requirements of 19.2.2.2.6.

19.1.1.4.4 Changes of Occupancy. Changes of occupancy shall comply with 4.6.11. A change from one health care occupancy subclassification to another shall require compliance with the requirements for new construction.

Exception No. 1: A change from a hospital to a nursing home or from a nursing home to a hospital shall not be considered a change in occupancy or occupancy subclassification.

Exception No. 2: A change from a hospital or nursing home to a limited care facility shall not be considered a change in occupancy or occupancy subclassification.

Exception No. 3: A change from a hospital or nursing home to an ambulatory health care facility shall not be considered a change in occupancy or occupancy subclassification.

19.1.1.4.5* Renovations, Alterations, and Modernizations. Where major renovations, alterations, or modernizations are made in a nonsprinklered facility, the automatic sprinkler requirements of Chapter 18 shall apply to a smoke compartment undergoing the renovation, alteration, or modernization. However, in cases where the building is not protected throughout by an approved automatic sprinkler system, the requirements of 19.1.6 and 19.2.3.2 shall also apply. Exception No. 2 to 18.3.7.3 shall be permitted only where adjacent smoke compartments are protected throughout by an approved, supervised automatic sprinkler system in accordance with 18.3.5.2. Where minor renovations, alterations, modernizations, or repairs are done in a nonsprinklered facil-

ity, the requirements of 18.3.5.1 shall not apply but, in such cases, the renovations, alterations, modernizations, or repairs shall not reduce life safety below the level that previously existed, nor below the level of the requirements of Chapter 19 for nonsprinklered buildings. (See 4.6.7.)

19.1.1.4.6 Construction, Repair, and Improvement Operations. (See 4.6.10.)

19.1.2 Mixed Occupancies. (See also 6.1.14.)

19.1.2.1* Sections of health care facilities shall be permitted to be classified as other occupancies, provided that they meet all of the following conditions:

- (1) They are not intended to serve health care occupants for purposes of housing, treatment, or customary access by patients incapable of self-preservation.
- (2) They are separated from areas of health care occupancies by construction having a fire resistance rating of not less than 2 hours.

19.1.2.2* Ambulatory care facilities, medical clinics, and similar facilities that are contiguous to health care occupancies but are primarily intended to provide outpatient services shall be permitted to be classified as business occupancies or ambulatory health care facilities, provided that the facilities are separated from the health care occupancy by not less than 2-hour fire resistance-rated construction and the facility is not intended to provide services simultaneously for four or more health care patients who are litterborne.

19.1.2.3 Health care occupancies in buildings housing other occupancies shall be completely separated from them by construction having a fire resistance rating of not less than 2 hours as provided for additions in 19.1.1.4.

19.1.2.4 All means of egress from health care occupancies that traverse non-health care spaces shall conform to the requirements of this Code for health care occupancies.

Exception: Exit through a horizontal exit into other contiguous occupancies that do not conform with health care egress provisions, but that do comply with requirements set forth in the appropriate occupancy chapter of this Code, shall be permitted, provided that the occupancy does not contain high hazard contents. The horizontal exit shall comply with the requirements of 19.2.2.5.

19.1.2.5 Egress provisions for areas of health care facilities that correspond to other occupancies shall meet the corresponding requirements of this Code for such occupancies. Where the clinical needs of the occupant necessitate the locking of means of egress, staff shall be present for the supervised release of occupants during all times of use.

19.1.2.6 Auditoriums, chapels, staff residential areas, or other occupancies provided in connection with health care facilities shall have means of egress provided in accordance with other applicable sections of this Code.

19.1.2.7 Any area with a hazard of contents classified higher than that of the health care occupancy and located in the same building shall be protected as required in 19.3.2.

19.1.2.8 Non-health care-related occupancies classified as containing high hazard contents shall not be permitted in buildings housing health care occupancies.

19.1.3 Special Definitions.

Ambulatory Health Care Occupancy. See 3.3.8.

Hospital. See 3.3.104.

Limited Care Facility. See 3.3.117.

Nursing Home. See 3.3.132.

19.1.4 Classification of Occupancy. (See 19.1.3.)

19.1.5 Classification of Hazard of Contents. The classification of hazard of contents shall be as defined in Section 6.2.

19.1.6 Minimum Construction Requirements.

19.1.6.1 For the purpose of 19.1.6, the number of stories shall be counted starting with the primary level of exit discharge and ending with the highest occupiable level. For the purposes of 19.1.6, the primary level of exit discharge of a building shall be the lowest story whose floor is level with or above finished grade on the exterior wall line for 50 percent or more of its perimeter. Building levels below the primary level shall not be counted as a story.

19.1.6.2 Health care occupancies shall be limited to the types of building construction shown in Table 19.1.6.2. (See 8.2.1.)

*Exception:** Any building of Type I(443), Type I(332), Type II(222), or Type II(111) construction shall be permitted to include roofing systems involving combustible supports, decking, or roofing, provided that the following criteria are met:

(a) The roof covering meets Class C requirements in accordance with NFPA 256, Standard Methods of Fire Tests of Roof Coverings.

(b) The roof is separated from all occupied portions of the building by a noncombustible floor assembly that includes not less than 2¹/₂ in. (6.4 cm) of concrete or gypsum fill.

(c) The attic or other space is either unoccupied or protected throughout by an approved automatic sprinkler system.

Table 19.1.6.2 Construction Type Limitations

Construction Type	Stories			
	1	2	3	4 or More
I(443)	X	X	X	X
I(332)	X	X	X	X
II(222)	X	X	X	X
II(111)	X	X*	X*	NP
II(000)	X*	X*	NP	NP
III(211)	X*	X*	NP	NP
III(200)	X*	NP	NP	NP
IV(2HH)	X*	X*	NP	NP
V(111)	X*	X*	NP	NP
V(000)	X*	NP	NP	NP

X: Permitted type of construction.

NP: Not permitted.

*Building requires automatic sprinkler protection. (See 19.3.5.1.)

19.1.6.3 All interior walls and partitions in buildings of Type I or Type II construction shall be of noncombustible or limited-combustible materials.

*Exception:** Listed, fire-retardant-treated wood studs shall be permitted within non-load bearing 1-hour fire-rated partitions.

19.1.6.4 Each exterior wall of frame construction and all interior stud partitions shall be firestopped to cut off all concealed

draft openings, both horizontal and vertical, between any cellar or basement and the first floor. Such firestopping shall consist of wood not less than 2 in. (5 cm) (nominal) thick or shall be of noncombustible material.

19.1.7 Occupant Load. The occupant load, in number of persons for whom means of egress and other provisions are required, shall be determined on the basis of the occupant load factors of Table 7.3.1.2 that are characteristic of the use of the space or shall be determined as the maximum probable population of the space under consideration, whichever is greater.

SECTION 19.2 MEANS OF EGRESS REQUIREMENTS

19.2.1 General. Every aisle, passageway, corridor, exit discharge, exit location, and access shall be in accordance with Chapter 7.

Exception: As modified by 19.2.2 through 19.2.11.

19.2.2 Means of Egress Components.

19.2.2.1 Components of means of egress shall be limited to the types described in 19.2.2.2 through 19.2.2.10.

19.2.2.2 Doors.

19.2.2.2.1 Doors complying with 7.2.1 shall be permitted.

19.2.2.2.2 Locks shall not be permitted on patient sleeping room doors.

Exception No. 1: Key-locking devices that restrict access to the room from the corridor and that are operable only by staff from the corridor side shall be permitted. Such devices shall not restrict egress from the room.

Exception No. 2: Door-locking arrangements shall be permitted in health care occupancies, or portions of health care occupancies, where the clinical needs of the patients require specialized security measures for their safety, provided that keys are carried by staff at all times.

19.2.2.2.3 Doors not located in a required means of egress shall be permitted to be subject to locking.

19.2.2.2.4 Doors within a required means of egress shall not be equipped with a latch or lock that requires the use of a tool or key from the egress side.

Exception No. 1: Door-locking arrangements without delayed egress shall be permitted in health care occupancies, or portions of health care occupancies, where the clinical needs of the patients require specialized security measures for their safety, provided that staff can readily unlock such doors at all times. (See 19.1.1.1.5 and 19.2.2.2.5.)

*Exception No. 2:** Delayed-egress locks complying with 7.2.1.6.1 shall be permitted, provided that not more than one such device is located in any egress path.

Exception No. 3: Access-controlled egress doors complying with 7.2.1.6.2 shall be permitted.

19.2.2.2.5 Doors located in the means of egress that are permitted to be locked under other provisions of this chapter shall have adequate provisions made for the rapid removal of occupants by means such as remote control of locks, keying of all locks to keys carried by staff at all times, or other such reliable means available to the staff at all times. Only one such locking device shall be permitted on each door.

Exception No. 1: Locks in accordance with Exception Nos. 2 and 3 to 19.2.2.2.4.

Exception No. 2: More than one lock shall be permitted on each door subject to approval of the authority having jurisdiction.

19.2.2.2.6* Any door in an exit passageway, stairway enclosure, horizontal exit, smoke barrier, or hazardous area enclosure shall be permitted to be held open only by an automatic release device that complies with 7.2.1.8.2. The automatic sprinkler system, if provided, and the fire alarm system, and the systems required by 7.2.1.8.2 shall be arranged to initiate the closing action of all such doors throughout the smoke compartment or throughout the entire facility.

19.2.2.2.7 Where doors in a stair enclosure are held open by an automatic release device as permitted in 19.2.2.2.6, initiation of a door-closing action on any level shall cause all doors at all levels in the stair enclosure to close.

19.2.2.2.8* Existing health care occupancies shall be exempt from the re-entry provisions of 7.2.1.5.2.

19.2.2.2.9 Horizontal sliding doors, as permitted by 7.2.1.14, that are not automatic-closing shall be limited to a single leaf and shall have a latch or other mechanism that ensures that doors will not rebound into a partially open position if forcefully closed in an emergency.

19.2.2.3 Stairs. Stairs complying with 7.2.2 shall be permitted.

19.2.2.4 Smokeproof Enclosures. Smokeproof enclosures complying with 7.2.3 shall be permitted.

19.2.2.5 Horizontal Exits. Horizontal exits complying with 7.2.4 and the modifications of 19.2.2.5.1 through 19.2.2.5.4 shall be permitted.

19.2.2.5.1 Not less than 30 net ft² (2.8 net m²) per patient in a hospital or nursing home, or not less than 15 net ft² (1.4 net m²) per resident in a limited care facility, shall be provided within the aggregated area of corridors, patient rooms, treatment rooms, lounge or dining areas, and other similar areas on each side of the horizontal exit. On stories not housing bed or litterborne patients, not less than 6 net ft² (0.56 net m²) per occupant shall be provided on each side of the horizontal exit for the total number of occupants in adjoining compartments.

19.2.2.5.2 The total egress capacity of the other exits (stairs, ramps, doors leading outside the building) shall not be reduced below one-third of that required for the entire area of the building.

19.2.2.5.3* A door in a horizontal exit shall not be required to swing with egress travel as specified in 7.2.4.3.6(1).

19.2.2.5.4 Door openings in horizontal exits shall be protected by a swinging door providing a clear width of not less than 32 in. (81 cm) or by a horizontal sliding door complying with 7.2.1.14 that provides a clear width of not less than 32 in. (81 cm).

Exception: Existing 34-in. (86-cm) swinging doors.

19.2.2.6 Ramps.

19.2.2.6.1 Ramps complying with 7.2.5 shall be permitted.

19.2.2.6.2 Ramps enclosed as exits shall be of sufficient width to provide egress capacity in accordance with 19.2.3.2.

19.2.2.7 Exit Passageways. Exit passageways complying with 7.2.6 shall be permitted.

19.2.2.8 Fire Escape Ladders. Fire escape ladders complying with 7.2.9 shall be permitted.

19.2.2.9 Alternating Tread Devices. Alternating tread devices complying with 7.2.11 shall be permitted.

19.2.2.10 Areas of Refuge. Areas of refuge used as part of a required accessible means of egress shall comply with 7.2.12.

19.2.3 Capacity of Means of Egress.

19.2.3.1 The capacity of any required means of egress shall be based on its width, as defined in Section 7.3.

19.2.3.2 The capacity of means of egress providing travel by means of stairs shall be 0.6 in. (1.5 cm) per person, and the capacity of means of egress providing horizontal travel (without stairs) by means such as doors, ramps, or horizontal exits shall be 0.5 in. (1.3 cm) per person.

Exception: The capacity of means of egress in health care occupancies protected throughout by an approved, supervised automatic sprinkler system in accordance with 19.3.5.2 shall be 0.3 in. (0.8 cm) per person for travel by means of stairs and 0.2 in. (0.5 cm) per person for horizontal travel without stairs.

19.2.3.3* Any required aisle, corridor, or ramp shall be not less than 4 ft (1.2 m) in clear width where serving as means of egress from patient sleeping rooms. The aisle, corridor, or ramp shall be arranged to avoid any obstructions to the convenient removal of nonambulatory persons carried on stretchers or on mattresses serving as stretchers.

Exception No. 1: Aisles, corridors, and ramps in adjunct areas not intended for the housing, treatment, or use of inpatients shall be not less than 44 in. (112 cm) in clear and unobstructed width.

Exception No. 2: Exit access within a room or suite of rooms complying with the requirements of 19.2.5.

19.2.3.4 (Reserved.)

19.2.3.5 The minimum clear width for doors in the means of egress from hospitals; nursing homes; limited care facilities; psychiatric hospital sleeping rooms; and diagnostic and treatment areas, such as x-ray, surgery, or physical therapy, shall be not less than 32 in. (81 cm) wide.

Exception No. 1: Existing 34-in. (86-cm) doors

Exception No. 2: Existing 28-in. (71-cm) corridor doors in facilities where the fire plans do not require evacuation by bed, gurney, or wheelchair.

19.2.4 Number of Exits.

19.2.4.1 Not less than two exits of the types described in 19.2.2.2 through 19.2.2.10, remotely located from each other, shall be provided for each floor or fire section of the building.

19.2.4.2 Not less than one exit from each floor or fire section shall be one of the following:

- (1) A door leading directly outside the building
- (2) A stair
- (3) A smokeproof enclosure
- (4) A ramp
- (5) An exit passageway

Any fire section not meeting these requirements shall be considered part of an adjoining zone. Egress shall not require return through the zone of fire origin.

19.2.4.3* Not less than two exits of the types described in 19.2.2.2 through 19.2.2.10 shall be accessible from each smoke

compartment. Egress shall be permitted through an adjacent compartment(s) but shall not require return through the compartment of fire origin.

19.2.5 Arrangement of Means of Egress.

19.2.5.1 Every habitable room shall have an exit access door leading directly to an exit access corridor.

Exception No. 1: If there is an exit door opening directly to the outside from the room at ground level.

Exception No. 2: Exit access from a patient sleeping room with not more than eight patient beds shall be permitted to pass through one intervening room to reach the exit access corridor.

Exception No. 3: Exit access from a special nursing suite shall be permitted to pass through one intervening room to reach the exit access corridor where the arrangement allows for direct and constant visual supervision by nursing personnel.

Exception No. 4: Exit access from a suite of rooms, other than patient sleeping rooms, shall be permitted to pass through not more than two adjacent rooms to reach the exit access corridor where the travel distance within the suite is in accordance with 19.2.5.8.

19.2.5.2 Any patient sleeping room, or any suite that includes patient sleeping rooms, of more than 1000 ft² (93 m²) shall have not less than two exit access doors remotely located from each other.

19.2.5.3 Any room or any suite of rooms, other than patient sleeping rooms, of more than 2500 ft² (230 m²) shall have not less than two exit access doors remotely located from each other.

19.2.5.4 Any suite of rooms that complies with the requirements of 19.2.5 shall be permitted to be subdivided with non-fire-rated, noncombustible, or limited-combustible partitions.

19.2.5.5 Intervening rooms shall not be hazardous areas as defined by 19.3.2.

19.2.5.6 Suites of sleeping rooms shall not exceed 5000 ft² (460 m²).

19.2.5.7 Suites of rooms, other than patient sleeping rooms, shall not exceed 10,000 ft² (930 m²).

19.2.5.8 Suites of rooms, other than patient sleeping rooms, shall be permitted to have one intervening room if the travel distance within the suite to the exit access door does not exceed 100 ft (30 m) and shall be permitted to have two intervening rooms where the travel distance within the suite to the exit access door does not exceed 50 ft (15 m).

19.2.5.9* Every corridor shall provide access to not less than two approved exits in accordance with Sections 7.4 and 7.5 without passing through any intervening rooms or spaces other than corridors or lobbies.

19.2.5.10 Existing dead-end corridors shall be permitted to be continued to be used if it is impractical and unfeasible to alter them so that exits are accessible in not less than two different directions from all points in aisles, passageways, and corridors.

19.2.6 Travel Distance to Exits.

19.2.6.1 Travel distance shall be measured in accordance with Section 7.6.

19.2.6.2 Travel Distance. Travel distance shall comply with 19.2.6.2.1 through 19.2.6.2.4.

19.2.6.2.1 The travel distance between any room door required as an exit access and an exit shall not exceed 100 ft (30 m).

Exception: The maximum travel distance shall be permitted to be increased by 50 ft (15 m) in buildings protected throughout by an approved, supervised automatic sprinkler system.

19.2.6.2.2 The travel distance between any point in a room and an exit shall not exceed 150 ft (45 m).

Exception: The maximum travel distance shall be permitted to be increased by 50 ft (15 m) in buildings protected throughout by an approved, supervised automatic sprinkler system.

19.2.6.2.3 The travel distance between any point in a health care sleeping room and an exit access door in that room shall not exceed 50 ft (15 m).

19.2.6.2.4 The travel distance between any point in a suite of sleeping rooms as permitted by 19.2.5 and an exit access door of that suite shall not exceed 100 ft (30 m) and shall meet the requirements of 19.2.6.2.2.

19.2.7 Discharge from Exits. Discharge from exits shall be arranged in accordance with Section 7.7.

19.2.8 Illumination of Means of Egress. Means of egress shall be illuminated in accordance with Section 7.8.

19.2.9 Emergency Lighting.

19.2.9.1 Emergency lighting shall be provided in accordance with Section 7.9.

19.2.10 Marking of Means of Egress.

19.2.10.1 Means of egress shall have signs in accordance with Section 7.10.

Exception: Where the path of egress travel is obvious, signs shall not be required in one-story buildings with an occupant load of fewer than 30 persons.

19.2.11 Special Means of Egress Features. (Reserved.)

SECTION 19.3 PROTECTION

19.3.1 Protection of Vertical Openings.

19.3.1.1 Any vertical opening shall be enclosed or protected in accordance with 8.2.5. Where enclosure is provided, the construction shall have not less than a 1-hour fire resistance rating.

Exception No. 1: Unprotected vertical openings in accordance with 8.2.5.8 shall be permitted.

Exception No. 2: Exception No. 1 to 8.2.5.6(1) shall not apply to patient sleeping and treatment rooms.

Exception No. 3: Multilevel patient sleeping areas in psychiatric facilities shall be permitted without enclosure protection between levels, provided that all the following conditions are met:

(a) *The entire normally occupied area, including all communicating floor levels, is sufficiently open and unobstructed so that a fire or other dangerous condition in any part is obvious to the occupants or supervisory personnel in the area.*

(b) *Egress capacity is sufficient to provide simultaneously for all the occupants of all communicating levels and areas, with all communicating levels in the same fire area being considered as a single floor area for purposes of determination of required egress capacity.*

(c) *The height between the highest and lowest finished floor levels*

shall not exceed 13 ft (4 m); the number of levels shall not be restricted.

Exception No. 4: Unprotected openings in accordance with 8.2.5.5 shall not be permitted.

Exception No. 5: Where a full enclosure of a stairway that is not a required exit is impracticable, the required enclosure shall be permitted to be limited to that necessary to prevent a fire originating in any story from spreading to any other story.

19.3.1.2 A door in a stair enclosure shall be self-closing and shall normally be kept in the closed position.

Exception: Doors in stair enclosures held open under the conditions specified by 19.2.2.2.6 and 19.2.2.2.7.

19.3.2 Protection from Hazards.

19.3.2.1 Hazardous Areas. Any hazardous areas shall be safeguarded by a fire barrier having a 1-hour fire resistance rating or shall be provided with an automatic extinguishing system in accordance with 8.4.1. The automatic extinguishing shall be permitted to be in accordance with 19.3.5.4. Where the sprinkler option is used, the areas shall be separated from other spaces by smoke-resisting partitions and doors. The doors shall be self-closing or automatic-closing. Hazardous areas shall include, but shall not be restricted to, the following:

- (1) Boiler and fuel-fired heater rooms
- (2) Central/bulk laundries larger than 100 ft² (9.3 m²)
- (3) Paint shops
- (4) Repair shops
- (5) Soiled linen rooms
- (6) Trash collection rooms
- (7) Rooms or spaces larger than 50 ft² (4.6 m²), including repair shops, used for storage of combustible supplies and equipment in quantities deemed hazardous by the authority having jurisdiction
- (8) Laboratories employing flammable or combustible materials in quantities less than those that would be considered a severe hazard.

Exception: Doors in rated enclosures shall be permitted to have non-rated, factory- or field-applied protective plates extending not more than 48 in. (122 cm) above the bottom of the door.

19.3.2.2* Laboratories. Laboratories employing quantities of flammable, combustible, or hazardous materials that are considered as a severe hazard shall be protected in accordance with NFPA 99, *Standard for Health Care Facilities*.

19.3.2.3 Anesthetizing Locations. Anesthetizing locations shall be protected in accordance with NFPA 99, *Standard for Health Care Facilities*.

19.3.2.4 Medical Gas. Medical gas storage and administration areas shall be protected in accordance with NFPA 99, *Standard for Health Care Facilities*.

19.3.2.5 Gift Shops. Gift shops shall be protected as hazardous areas where used for the storage or display of combustibles in quantities considered hazardous. Gift shops not considered hazardous and having separately protected storage shall be permitted to be as follows:

- (1) Open to a lobby or corridor if the gift shop does not exceed 500 ft² (46.5 m²) and is protected throughout by an approved automatic sprinkler system
- (2) Separated from a lobby or corridor by non-fire-rated walls if the gift shop is protected throughout by an approved automatic sprinkler system

19.3.2.6 Cooking Facilities. Cooking facilities shall be protected in accordance with 9.2.3.

Exception. Where domestic cooking equipment is used for food-warming or limited cooking, protection or segregation of food preparation facilities shall not be required.*

19.3.3 Interior Finish.

19.3.3.1 Interior finish shall be in accordance with Section 10.2.

19.3.3.2 Interior Wall and Ceiling Finish. Interior wall and ceiling finish materials complying with 10.2.3 shall be permitted as follows:

(1) Existing materials — Class A or Class B

Exception: In rooms protected by an approved, supervised automatic sprinkler system, existing Class C interior finish shall be permitted to be continued to be used on walls and ceilings within rooms separated from the exit access corridors in accordance with 19.3.6.

(2) Newly installed materials — Class A

Exception No. 1: Newly installed walls and ceilings shall be permitted to have Class A or Class B interior finish in individual rooms having a capacity not exceeding four persons.

Exception No. 2: Newly installed corridor wall finish not exceeding 4 ft (1.2 m) in height that is restricted to the lower half of the wall shall be permitted to be Class A or Class B.

19.3.3.3 Interior Floor Finish. Newly installed interior floor finish complying with 10.2.7 shall be permitted in corridors and exits if Class I. No restrictions shall apply to existing interior floor finish.

Exception: In smoke compartments protected throughout by an approved, supervised automatic sprinkler system in accordance with 19.3.5.2, no interior floor finish requirements shall apply.

19.3.4 Detection, Alarm, and Communications Systems.

19.3.4.1 General. Health care occupancies shall be provided with a fire alarm system in accordance with Section 9.6.

19.3.4.2* Initiation. Initiation of the required fire alarm systems shall be by manual means in accordance with 9.6.2 and by means of any required sprinkler system waterflow alarms, detection devices, or detection systems.

Exception No. 1: Manual fire alarm boxes in patient sleeping areas shall not be required at exits if located at all nurses' control stations or other continuously attended staff location, provided that such manual fire alarm boxes are visible and continuously accessible and that travel distances required by 9.6.2.4 are not exceeded.

Exception No. 2: Fixed extinguishing systems protecting commercial cooking equipment in kitchens that are protected by a complete automatic sprinkler system shall not be required to initiate the fire alarm system.

Exception No. 3: Detectors required by the exceptions to 19.7.5.2 and 19.7.5.3.

19.3.4.3 Notification.

19.3.4.3.1 Occupant Notification. Occupant notification shall be accomplished automatically in accordance with 9.6.3.

Exception No. 1: In lieu of audible alarm signals, visible alarm-indicating appliances shall be permitted to be used in critical care areas.*

Exception No. 2: Where visual devices have been installed in patient sleeping areas in place of the audible alarm, they shall be permitted where accepted by the authority having jurisdiction.

19.3.4.3.2 Emergency Forces Notification. Fire department notification shall be accomplished in accordance with 9.6.4.

Exception: Smoke detection devices or smoke detection systems equipped with reconfirmation features shall not be required to automatically notify the fire department unless the alarm condition is reconfirmed after a period not exceeding 120 seconds.

19.3.4.4 Emergency Control. Operation of any activating device in the required fire alarm system shall be arranged to accomplish automatically any control functions to be performed by that device. (See 9.6.5.)

19.3.4.5 Detection.

19.3.4.5.1 Corridors. An approved automatic smoke detection system shall be installed in all corridors of limited care facilities. Such system shall be in accordance with Section 9.6.

Exception No. 1: Where each patient sleeping room is protected by an approved smoke detection system, and a smoke detector is provided at smoke barriers and horizontal exits in accordance with Section 9.6, the corridor smoke detection system shall not be required on the patient sleeping room floors.

Exception No. 2: Smoke compartments protected throughout by an approved, supervised automatic sprinkler system in accordance with 19.3.5.2.

19.3.4.5.2 Detection in Spaces Open to Corridors. (See 19.3.6.1.)

19.3.5 Extinguishment Requirements.

19.3.5.1 Where required by 19.1.6, health care facilities shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

Exception: In Type I and Type II construction, where approved by the authority having jurisdiction, alternative protection measures shall be permitted to be substituted for sprinkler protection in specified areas where the authority having jurisdiction has prohibited sprinklers, without causing a building to be classified as nonsprinklered.

19.3.5.2* Where this Code permits exceptions for fully sprinklered buildings or smoke compartments, the sprinkler system shall meet the following criteria:

- (1) It shall be in accordance with Section 9.7.
- (2) It shall be electrically connected to the fire alarm system.
- (3) It shall be fully supervised.

Exception: In Type I and Type II construction, where approved by the authority having jurisdiction, alternative protection measures shall be permitted to be substituted for sprinkler protection in specified areas where the authority having jurisdiction has prohibited sprinklers, without causing a building to be classified as nonsprinklered.

19.3.5.3* Where this Code permits exceptions for fully sprinklered buildings or smoke compartments and specifically references this paragraph, the sprinkler system shall meet the following criteria:

- (1) It shall be installed throughout the building in accordance with Section 9.7.
- (2) It shall be electrically connected to the fire alarm system.
- (3) It shall be fully supervised.
- (4) It shall be equipped with listed quick-response or listed residential sprinklers throughout all smoke compartments containing patient sleeping rooms.

Exception No. 1: Standard response sprinklers shall be permitted to be continued to be used in existing approved sprinkler systems where quick-response and residential sprinklers were not listed for use in such locations at the time of installation.

Exception No. 2: Standard response sprinklers shall be permitted for use in hazardous areas protected in accordance with 19.3.2.1.

19.3.5.4 Isolated hazardous areas shall be permitted to be protected in accordance with 9.7.1.2. For new installations in existing health care occupancies, where more than two sprinklers are installed in a single area, waterflow detection shall be provided to sound the building fire alarm, or to notify by a signal, any constantly attended location, such as PBX, security, or emergency room, at which the necessary corrective action shall be taken.

19.3.5.5* Newly introduced cubicle curtains in sprinklered areas shall be installed in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*.

19.3.5.6 Portable fire extinguishers shall be provided in all health care occupancies in accordance with 9.7.4.1.

19.3.6 Corridors.

19.3.6.1 Corridors shall be separated from all other areas by partitions complying with 19.3.6.2 through 19.3.6.5. (See also 19.2.5.9.)

Exception No. 1: Smoke compartments protected throughout by an approved, supervised automatic sprinkler system in accordance with 19.3.5.3 shall be permitted to have spaces that are unlimited in size open to the corridor, provided that the following criteria are met:

(a) *The spaces are not used for patient sleeping rooms, treatment rooms, or hazardous areas.*

(b) *The corridors onto which the spaces open in the same smoke compartment are protected by an electrically supervised automatic smoke detection system in accordance with 19.3.4, or the smoke compartment in which the space is located is protected throughout by quick-response sprinklers.*

(c) *The open space is protected by an electrically supervised automatic smoke detection system in accordance with 19.3.4, or the entire space is arranged and located to allow direct supervision by the facility staff from a nurses' station or similar space.*

(d) *The space does not obstruct access to required exits.*

Exception No. 2: In smoke compartments protected throughout by an approved, supervised automatic sprinkler system in accordance with 19.3.5.3, waiting areas shall be permitted to be open to the corridor, provided that the following criteria are met:

(a) *The aggregate waiting area in each smoke compartment does not exceed 600 ft² (55.7 m²).*

(b) *Each area is protected by an electrically supervised automatic smoke detection system in accordance with 19.3.4, or each area is arranged and located to allow direct supervision by the facility staff from a nursing station or similar space.*

(c) *The area does not obstruct access to required exits.*

Exception No. 3: Spaces for nurses' stations.*

Exception No. 4: Gift shops open to the corridor where protected in accordance with 19.3.2.5.

Exception No. 5: Limited care facilities in smoke compartments protected throughout by an approved, supervised automatic sprinkler system in accordance with 19.3.5.3 shall be permitted to have group meeting or multipurpose therapeutic spaces open to the corridor, provided that the following criteria are met:

(a) *The space is not a hazardous area.*

(b) *The space is protected by an electrically supervised automatic smoke detection system in accordance with 19.3.4, or the space is arranged and located to allow direct supervision by the facility staff from the nurses' station or similar location.*

(c) *The area does not obstruct access to required exits.*

Exception No. 6: Spaces other than patient sleeping rooms, treatment rooms, and hazardous areas shall be permitted to be open to the corridor and unlimited in area, provided that the following criteria are met:

(a) *The space and the corridors onto which it opens, where located in the same smoke compartment, are protected by an electrically supervised automatic smoke detection system in accordance with 19.3.4.*

(b)* *Each space is protected by automatic sprinklers, or the furnishings and furniture, in combination with all other combustibles within the area, are of such minimum quantity and arrangement that a fully developed fire is unlikely to occur.*

(c) *The space does not obstruct access to required exits.*

Exception No. 7: Waiting areas shall be permitted to be open to the corridor, provided that the following criteria are met:*

(a) *Each area does not exceed 600 ft² (55.7 m²).*

(b) *The area is equipped with an electrically supervised automatic smoke detection system in accordance with 19.3.4.*

(c) *The area does not obstruct any access to required exits.*

Exception No. 8: In a limited care facility, group meeting or multipurpose therapeutic spaces, other than hazardous areas, that are under continuous supervision by facility staff shall be permitted to be open to the corridor, provided that the following criteria are met:

(a) *Each area does not exceed 1500 ft² (140 m²).*

(b) *Not more than one such space is permitted per smoke compartment.*

(c) *The area is equipped with an electrically supervised automatic smoke detection system in accordance with 19.3.4.*

(d) *The area does not obstruct access to required exits.*

19.3.6.2 Construction of Corridor Walls.

19.3.6.2.1* Corridor walls shall be continuous 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, and they shall have a fire resistance rating of not less than 1/2 hour.

Exception No. 1: In smoke compartments protected throughout by an approved, supervised automatic sprinkler system in accordance with 19.3.5.2, a corridor shall be permitted to be separated from all other areas by non-fire-rated partitions and shall be permitted to terminate at the ceiling where the ceiling is constructed to limit the transfer of smoke.*

Exception No. 2: Existing corridor partitions shall be permitted to terminate at ceilings that are not an integral part of a floor construction if 5 ft (1.5 m) or more of space exists between the top of the ceiling subsystem and the bottom of the floor or roof above, provided that the following criteria are met:

(a) *The ceiling shall be part of a fire-rated assembly tested to have a fire resistance rating of not less than 1 hour in compliance with the provisions of 8.2.3.1.*

(b) *The corridor partitions form smoketight joints with the ceilings (joint filler, if used, shall be noncombustible).*

(c) *Each compartment of interstitial space that constitutes a separate smoke area is vented, in a smoke emergency, to the outside by mechanical means having sufficient capacity to provide not less than two air changes per hour but, in no case, a capacity less than 5000 ft³/min (2.36 m³/s).*

(d) *The interstitial space shall not be used for storage.*

(e) *The space shall not be used as a plenum for supply, exhaust, or return air, except as noted in 19.3.6.2.1(3).*

*Exception No. 3:** Existing corridor partitions shall be permitted to terminate at monolithic ceilings that resist the passage of smoke where there is a smoketight joint between the top of the partition and the bottom of the ceiling.

19.3.6.2.2* Corridor walls shall form a barrier to limit the transfer of smoke.

19.3.6.2.3 Fixed fire window assemblies in accordance with 8.2.3.2.2 shall be permitted in corridor walls.

Exception: There shall be no restrictions in area and fire resistance of glass and frames in smoke compartments protected throughout by an approved, supervised automatic sprinkler system in accordance with 19.3.5.2.

19.3.6.3 Corridor Doors.

19.3.6.3.1* Doors protecting corridor openings in other than required enclosures of vertical openings, exits, or hazardous areas shall be substantial doors, such as those constructed of 1³/₄-in. (4.4-cm) thick, solid-bonded core wood or of construction that resists fire for not less than 20 minutes and shall be constructed to resist the passage of smoke. Compliance with NFPA 80, *Standard for Fire Doors and Fire Windows*, shall not be required. Clearance between the bottom of the door and the floor covering not exceeding 1 in. (2.5 cm) shall be permitted for corridor doors.

Exception No. 1: Doors to toilet rooms, bathrooms, shower rooms, sink closets, and similar auxiliary spaces that do not contain flammable or combustible materials.

Exception No. 2: In smoke compartments protected throughout by an approved, supervised automatic sprinkler system in accordance with 19.3.5.2, the door construction requirements of 19.3.6.3.1 shall not be mandatory, but the doors shall be constructed to resist the passage of smoke.

19.3.6.3.2* Doors shall be provided with a means suitable for keeping the door closed that is acceptable to the authority having jurisdiction. The device used shall be capable of keeping the door fully closed if a force of 5 lbf (22 N) is applied at the latch edge of the door. Roller latches shall be prohibited on corridor doors in buildings not fully protected by an approved automatic sprinkler system in accordance with 19.3.5.2.

Exception No. 1: Doors to toilet rooms, bathrooms, shower rooms, sink closets, and similar auxiliary spaces that do not contain flammable or combustible materials.

Exception No. 2: Existing roller latches demonstrated to keep the door closed against a force of 5 lbf (22 N) shall be permitted to be kept in service.

19.3.6.3.3* Hold-open devices that release when the door is pushed or pulled shall be permitted.

19.3.6.3.4 Door-closing devices shall not be required on doors in corridor wall openings other than those serving required exits, smoke barriers, or enclosures of vertical openings and hazardous areas.

19.3.6.3.5 Nonrated, factory- or field-applied protective plates extending not more than 48 in. (122 cm) above the bottom of the door shall be permitted.

19.3.6.3.6 Dutch doors shall be permitted where they conform to 19.3.6.3. In addition, both the upper leaf and lower leaf shall be equipped with a latching device, and the meeting edges of the upper and lower leaves shall be equipped with an astragal, a rabbet, or a bevel.

Dutch doors protecting openings in enclosures around hazardous areas shall comply with NFPA 80, *Standard for Fire Doors and Fire Windows*.

19.3.6.3.7 Door frames shall be labeled, shall be of steel construction, or shall be of other materials in compliance with the provisions of 8.2.3.2.1.

Exception: Door frames in smoke compartments protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

19.3.6.3.8 Fixed fire window assemblies in accordance with 8.2.3.2.2 shall be permitted in corridor doors.

Exception: There shall be no restrictions in area and fire resistance of glass and frames in smoke compartments protected throughout by an approved, supervised automatic sprinkler system in accordance with 19.3.5.2.

19.3.6.4 Transfer Grilles. Transfer grilles, regardless of whether they are protected by fusible link-operated dampers, shall not be used in these walls or doors.

Exception: Doors to toilet rooms, bathrooms, shower rooms, sink closets, and similar auxiliary spaces that do not contain flammable or combustible materials shall be permitted to have ventilating louvers or to be undercut.

19.3.6.5 Openings. In other than smoke compartments containing patient bedrooms, miscellaneous openings such as mail slots, pharmacy pass-through windows, laboratory pass-through windows, and cashier pass-through windows shall be permitted to be installed in vision panels or doors without special protection, provided that the aggregate area of openings per room does not exceed 20 in.² (130 cm²), and the openings are installed at or below half the distance from the floor to the room ceiling.

Exception: For rooms protected throughout by an approved, supervised automatic sprinkler system in accordance with 19.3.5.2, the aggregate area of openings per room shall not exceed 80 in.² (520 cm²).

19.3.7 Subdivision of Building Spaces.

19.3.7.1 Smoke barriers shall be provided to divide every story used for sleeping rooms for more than 30 patients into not less than two smoke compartments. The size of any such smoke compartment shall not exceed 22,500 ft² (2100 m²), and the travel distance from any point to reach a door in the required smoke barrier shall not exceed 200 ft (60 m).

Exception No. 1: Where neither the length nor width of the smoke compartment exceeds 150 ft (45 m), the travel distance to reach the smoke barrier door shall not be limited.

Exception No. 2: The area of an atrium separated in accordance with 8.2.5.6 shall not be limited in size.

19.3.7.2 For purposes of the requirements of 19.3.7, the number of health care occupants shall be determined by actual count of patient bed capacity.

19.3.7.3 Any required smoke barrier shall be constructed in accordance with Section 8.3 and shall have a fire resistance rating of not less than 1/2 hour.

Exception No. 1: Where an atrium is used, smoke barriers shall be permitted to terminate at an atrium wall constructed in accordance with *Exception No. 2* to 8.2.5.6(1). Not less than two separate smoke compartments shall be provided on each floor.

*Exception No. 2:** Dampers shall not be required in duct penetrations of smoke barriers in fully ducted heating, ventilating, and air condi-

tioning systems where an approved, supervised automatic sprinkler system in accordance with 19.3.5.3 has been provided for smoke compartments adjacent to the smoke barrier.

19.3.7.4 Not less than 30 net ft² (2.8 net m²) per patient in a hospital or nursing home, or not less than 15 net ft² (1.4 net m²) per resident in a limited care facility, shall be provided within the aggregate area of corridors, patient rooms, treatment rooms, lounge or dining areas, and other low hazard areas on each side of the smoke barrier. On stories not housing bed or litterborne patients, not less than 6 net ft² (0.56 net m²) per occupant shall be provided on each side of the smoke barrier for the total number of occupants in adjoining compartments.

19.3.7.5 Openings in smoke barriers shall be protected by fire-rated glazing; by wired glass panels and steel frames; by substantial doors, such as 1³/₄-in. (4.4-cm) thick, solid-bonded wood core doors; or by construction that resists fire for not less than 20 minutes. Nonrated factory- or field-applied protective plates extending not more than 48 in. (122 cm) above the bottom of the door shall be permitted.

Exception: Doors shall be permitted to have fixed fire window assemblies in accordance with 8.2.3.2.2.

19.3.7.6* Doors in smoke barriers shall comply with 8.3.4 and shall be self-closing or automatic-closing in accordance with 19.2.2.2.6. Such doors in smoke barriers shall not be required to swing with egress travel. Positive latching hardware shall not be required.

19.3.7.7 Door openings in smoke barriers shall be protected by a swinging door providing a clear width of not less than 32 in. (81 cm) or by a horizontal sliding door complying with 7.2.1.14 and providing a clear width of not less than 32 in. (81 cm).

Exception: Existing 34-in. (86-cm) doors.

19.3.8 Special Protection Features — Outside Window or Door. Every patient sleeping room shall have an outside window or outside door.

Exception No. 1: Newborn nurseries and rooms intended for occupancy for less than 24 hours, such as those housing obstetrical labor beds, recovery beds, and observation beds in the emergency department.

Exception No. 2: Windows in atrium walls shall be considered outside windows for the purposes of this requirement.

SECTION 19.4 SPECIAL PROVISIONS

19.4.1 Windowless Buildings. See Section 11.7 for requirements for windowless buildings.

19.4.2 High-Rise Buildings. (Reserved.)

SECTION 19.5 BUILDING SERVICES

19.5.1 Utilities. Utilities shall comply with the provisions of Section 9.1.

Exception: Existing installations shall be permitted to be continued in service, provided that the systems do not present a serious hazard to life.

19.5.2 Heating, Ventilating, and Air Conditioning.

19.5.2.1 Heating, ventilating, and air conditioning shall comply with the provisions of Section 9.2 and shall be installed in accordance with the manufacturer's specifications.

Exception: As modified in 19.5.2.2.

19.5.2.2* Any heating device other than a central heating plant shall be designed and installed so that combustible material will not be ignited by the device or its appurtenances. If fuel-fired, such heating devices shall be chimney connected or vent connected, shall take air for combustion directly from the outside, and shall be designed and installed to provide for complete separation of the combustion system from the atmosphere of the occupied area. Any heating device shall have safety features to immediately stop the flow of fuel and shut down the equipment in case of either excessive temperature or ignition failure.

Exception No. 1: Approved, suspended unit heaters shall be permitted in locations other than means of egress and patient sleeping areas, provided that such heaters are located high enough to be out of the reach of persons using the area and are equipped with the safety features required by 19.5.2.2.

Exception No. 2: Fireplaces shall be permitted and used only in areas other than patient sleeping areas, provided that such areas are separated from patient sleeping spaces by construction having not less than a 1-hour fire resistance rating and that such fireplaces comply with the provisions of 9.2.2. In addition, the fireplace shall be equipped with a fireplace enclosure guaranteed against breakage up to a temperature of 650°F (343°C) and constructed of heat-tempered glass or other approved material. If, in the opinion of the authority having jurisdiction, special hazards are present, a lock on the enclosure and other safety precautions shall be permitted to be required.

19.5.3 Elevators, Escalators, and Conveyors. Elevators, escalators, and conveyors shall comply with the provisions of Section 9.4.

19.5.4 Rubbish Chutes, Incinerators, and Laundry Chutes.

19.5.4.1 Any existing linen and trash chute, including pneumatic rubbish and linen systems, that opens directly onto any corridor shall be sealed by fire-resistive construction to prevent further use or shall be provided with a fire door assembly having a fire protection rating of 1 hour. All new chutes shall comply with Section 9.5.

19.5.4.2 Any rubbish chute or linen chute, including pneumatic rubbish and linen systems, shall be provided with automatic extinguishing protection in accordance with Section 9.7. (See Section 9.5.)

19.5.4.3 Any trash chute shall discharge into a trash collection room used for no other purpose and protected in accordance with Section 8.4.

19.5.4.4 Existing flue-fed incinerators shall be sealed by fire-resistive construction to prevent further use.

SECTION 19.6 RESERVED

SECTION 19.7* OPERATING FEATURES

19.7.1 Evacuation and Relocation Plan and Fire Drills.

19.7.1.1 The administration of every health care occupancy shall have, in effect and available to all supervisory personnel, written copies of a plan for the protection of all persons in the event of fire, for their evacuation to areas of refuge, and for their evacuation from the building when necessary. All employees shall be periodically instructed and kept informed with respect to their duties under the plan. A copy of the plan shall be readily available at all times in the telephone operator's position or at the security center.

The provisions of 19.7.1.2 through 19.7.2.3 shall apply.

19.7.1.2* Fire drills in health care occupancies shall include the transmission of a fire alarm signal and simulation of emergency fire conditions. Drills shall be conducted quarterly on each shift to familiarize facility personnel (nurses, interns, maintenance engineers, and administrative staff) with the signals and emergency action required under varied conditions. When drills are conducted between 9:00 p.m. (2100 hours) and 6:00 a.m. (0600 hours), a coded announcement shall be permitted to be used instead of audible alarms.

Exception: Infirm or bedridden patients shall not be required to be moved during drills to safe areas or to the exterior of the building.

19.7.1.3 Employees of health care occupancies shall be instructed in life safety procedures and devices.

19.7.2 Procedure in Case of Fire.

19.7.2.1* For health care occupancies, the proper protection of patients shall require the prompt and effective response of health care personnel. The basic response required of staff shall include the removal of all occupants directly involved with the fire emergency, transmission of an appropriate fire alarm signal to warn other building occupants and summon staff, confinement of the effects of the fire by closing doors to isolate the fire area, and the relocation of patients as detailed in the health care occupancy's fire safety plan.

19.7.2.2 A written health care occupancy fire safety plan shall provide for the following:

- (1) Use of alarms
- (2) Transmission of alarm to fire department
- (3) Response to alarms
- (4) Isolation of fire
- (5) Evacuation of immediate area
- (6) Evacuation of smoke compartment
- (7) Preparation of floors and building for evacuation
- (8) Extinguishment of fire

19.7.2.3 All health care occupancy personnel shall be instructed in the use of and response to fire alarms. In addition, they shall be instructed in the use of the code phrase to ensure transmission of an alarm under the following conditions:

- (1) When the individual who discovers a fire must immediately go to the aid of an endangered person
- (2) During a malfunction of the building fire alarm system

Personnel hearing the code announced shall first activate the building fire alarm using the nearest manual fire alarm box and then shall execute immediately their duties as outlined in the fire safety plan.

19.7.3 Maintenance of Exits. Proper maintenance shall be provided to ensure the dependability of the method of evacuation selected. Health care occupancies that find it necessary to lock exits shall, at all times, maintain an adequate staff qualified to release locks and direct occupants from the immediate danger area to a place of safety in case of fire or other emergency.

19.7.4* Smoking. Smoking regulations shall be adopted and shall include not less than the following provisions:

- (1) Smoking shall be prohibited in any room, ward, or compartment where flammable liquids, combustible gases, or oxygen is used or stored and in any other hazardous location, and such areas shall be posted with signs that read

NO SMOKING or shall be posted with the international symbol for no smoking.

Exception: In health care occupancies where smoking is prohibited and signs are prominently placed at all major entrances, secondary signs with language that prohibits smoking shall not be required.

- (2) Smoking by patients classified as not responsible shall be prohibited.

Exception: The requirement of 19.7.4(2) shall not apply where the patient is under direct supervision.

- (3) Ashtrays of noncombustible material and safe design shall be provided in all areas where smoking is permitted.
- (4) Metal containers with self-closing cover devices into which ashtrays can be emptied shall be readily available to all areas where smoking is permitted.

19.7.5 Furnishings, Bedding, and Decorations.

19.7.5.1* Draperies, curtains, including cubicle curtains, and other loosely hanging fabrics and films serving as furnishings or decorations in health care occupancies shall be in accordance with the provisions of 10.3.1. (*See 19.3.5.5.*)

Exception: Curtains at showers.

19.7.5.2 Newly introduced upholstered furniture within health care occupancies shall meet the criteria specified when tested in accordance with the methods cited in 10.3.2(2) and 10.3.3.

Exception: Upholstered furniture belonging to the patient in sleeping rooms of nursing homes, provided that a smoke detector is installed in such rooms. Battery-powered single-station smoke detectors shall be permitted.

19.7.5.3 Newly introduced mattresses within health care occupancies shall meet the criteria specified when tested in accordance with the methods cited in 10.3.2(3) and 10.3.4.

Exception: Mattresses belonging to the patient in sleeping rooms of nursing homes, provided that a smoke detector is installed in such rooms. Battery-powered single-station smoke detectors shall be permitted.

19.7.5.4 Combustible decorations shall be prohibited in any health care occupancy unless they are flame-retardant.

Exception: Combustible decorations, such as photographs and paintings, in such limited quantities that a hazard of fire development or spread is not present.

19.7.5.5 Soiled linen or trash collection receptacles shall not exceed 32 gal (121 L) in capacity. The average density of container capacity in a room or space shall not exceed 0.5 gal/ft² (20.4 L/m²). A capacity of 32 gal (121 L) shall not be exceeded within any 64-ft² (5.9-m²) area. Mobile soiled linen or trash collection receptacles with capacities greater than 32 gal (121 L) shall be located in a room protected as a hazardous area when not attended.

Exception: Container size and density shall not be limited in hazardous areas.

19.7.6 Maintenance and Testing. (*See 4.6.12.*)

19.7.7* Engineered Smoke Control Systems. Existing engineered smoke control systems, unless specifically exempted by the authority having jurisdiction, shall be tested in accordance with established engineering principles. Systems not meeting the performance requirements of such testing shall be continued in operation only with the specific approval of the authority having jurisdiction.

19.7.8 Portable Space-Heating Devices. Portable space-heating devices shall be prohibited in all health care occupancies.

Exception: Portable space-heating devices shall be permitted to be used in nonsleeping staff and employee areas where the heating elements of such devices do not exceed 212°F (100°C).

19.7.9 Construction, Repair, and Improvement Operations.

19.7.9.1 Construction, repair, and improvement operations shall comply with 4.6.10.

19.7.9.2 The means of egress in any area undergoing construction, repair, or improvements shall be inspected daily for compliance with 7.1.10.1 and shall also comply with NFPA 241, *Standard for Safeguarding Construction, Alteration, and Demolition Operations*.

Chapter 20 NEW AMBULATORY HEALTH CARE OCCUPANCIES

SECTION 20.1 GENERAL REQUIREMENTS

20.1.1 Application.

20.1.1.1 General.

20.1.1.1.1 The requirements of this chapter apply to the following:

- (1) New buildings or portions thereof used as ambulatory health care occupancies (see 1.4.1)
- (2) Additions made to, or used as, an ambulatory health care occupancy (see 4.6.6 and 20.1.1.4)

Exception: Additions classified as occupancies other than ambulatory health care that are properly separated from the ambulatory health care occupancy in accordance with 20.1.2.1 and conform to the requirements for the specific occupancy.

- (3) Alterations, modernizations, or renovations of existing ambulatory health care occupancies (see 4.6.7 and 20.1.1.4)
- (4) Existing buildings or portions thereof upon change of occupancy to an ambulatory health care occupancy (see 4.6.11)

20.1.1.1.2 Ambulatory health care facilities shall comply with the provisions of Chapter 38 and this chapter, whichever is more stringent.

20.1.1.1.3 This chapter establishes life safety requirements, in addition to those required in Chapter 38, for the design of all ambulatory health care occupancies as defined in 3.3.8.

20.1.1.1.4 Buildings, or sections of buildings, that primarily house patients who, in the opinion of the governing body of the facility and the governmental agency having jurisdiction, are capable of judgment and appropriate physical action for self-preservation under emergency conditions shall be permitted to comply with chapters of this *Code* other than Chapter 20.

20.1.1.1.5 It shall be recognized that, in buildings providing treatment for certain types of patients or having detention rooms or a security section, it might be necessary to lock doors and bar windows to confine and protect building inhabitants. In such instances, the authority having jurisdiction shall make appropriate modifications to those sections of this *Code* that would otherwise require means of egress to be kept unlocked.

20.1.1.1.6* The requirements of this chapter are based on the assumption that staff is available in all patient-occupied areas to perform certain fire safety functions as required in other paragraphs of this chapter.

20.1.1.2* Goals and Objectives. The goals and objectives of Sections 4.1 and 4.2 shall be met with due consideration for functional requirements. This is accomplished by limiting the development and spread of a fire emergency to the room of fire origin and reducing the need for occupant evacuation, except from the room of fire origin.

20.1.1.3 Total Concept. All ambulatory health care facilities shall be designed, constructed, maintained, and operated to minimize the possibility of a fire emergency requiring the evacuation of occupants. Because the safety of ambulatory health care occupants cannot be ensured adequately by dependence on evacuation of the building, their protection from fire shall be provided by appropriate arrangement of

facilities, adequate, trained staff, and development of operating and maintenance procedures composed of the following:

- (1) Design, construction, and compartmentation
- (2) Provision for detection, alarm, and extinguishment
- (3) Fire prevention and the planning, training, and drilling programs for the isolation of fire, transfer of occupants to areas of refuge, or evacuation of the building

20.1.1.4 Additions, Conversions, Modernization, Renovation, and Construction Operations.

20.1.1.4.1 Additions. Additions shall be separated from any existing structure not conforming to the provisions within Chapter 21 by a fire barrier having not less than a 2-hour fire resistance rating and constructed of materials as required for the addition. (See 4.6.3 and 4.6.6.)

20.1.1.4.2 Communicating openings in dividing fire barriers required by 20.1.1.4.1 shall be permitted only in corridors and shall be protected by approved self-closing fire doors. (See also Section 8.2.)

20.1.1.4.3 Doors in barriers required by 20.1.1.4.1 shall normally be kept closed.

Exception: Doors shall be permitted to be held open if they meet the requirements of 20.2.2.3.

20.1.1.4.4 Changes of Occupancy. A change from a hospital or nursing home to an ambulatory health care occupancy shall not be considered a change in occupancy or occupancy sub-classification.

20.1.1.4.5 Renovations, Alterations, and Modernizations. (See 4.6.7.)

20.1.1.4.6 Construction, Repair, and Improvement Operations. (See 4.6.10.)

20.1.2 Mixed Occupancies. (See also 6.1.14.)

20.1.2.1* Sections of ambulatory health care facilities shall be permitted to be classified as other occupancies, provided that they meet all of the following conditions:

- (1) They are not intended to serve ambulatory health care occupants for purposes of treatment or customary access by patients incapable of self-preservation.
- (2) They are separated from areas of ambulatory health care occupancies by construction having a fire resistance rating of not less than 1 hour.

20.1.2.2 All means of egress from ambulatory health care occupancies that traverse nonambulatory health care spaces shall conform to requirements of this *Code* for ambulatory health care occupancies.

Exception: Exit through a horizontal exit into other contiguous occupancies that do not conform with ambulatory health care egress provisions, but that do comply with requirements set forth in the appropriate occupancy chapter of this *Code*, shall be permitted, provided that the occupancy does not contain high hazard contents.

20.1.2.3 Egress provisions for areas of ambulatory health care facilities that correspond to other occupancies shall meet the corresponding requirements of this *Code* for such occupancies. Where the clinical needs of the occupant necessitate the locking of means of egress, staff shall be present for the supervised release of occupants during all times of use.

20.1.2.4 Any area with a hazard of contents classified higher than that of the ambulatory health care occupancy and

located in the same building shall be protected as required in 20.3.2.

20.1.2.5 Non-health care-related occupancies classified as containing high hazard contents shall not be permitted in buildings housing ambulatory health care occupancies.

20.1.3 Special Definitions.

Ambulatory Health Care Occupancy. See 3.3.8.

20.1.4 Classification of Occupancy. (See 20.1.3.)

20.1.5 Classification of Hazard of Contents. The classification of hazard of contents shall be as defined in Section 6.2.

20.1.6 Minimum Construction Requirements.

20.1.6.1 For the purposes of 20.1.6, the number of stories shall be counted starting with the primary level of exit discharge and ending with the highest occupiable level. For the purposes of 20.1.6, the primary level of exit discharge of a building shall be that floor that is level with or above finished grade of the exterior wall line for 50 percent or more of its perimeter.

20.1.6.2 Buildings of one story in height housing ambulatory health care facilities shall be of any construction type in accordance with NFPA 220, *Standard on Types of Building Construction*. (See 8.2.1.)

20.1.6.3 Buildings of two or more stories in height housing ambulatory health care facilities shall be of Type I(443), Type I(332), Type II(222), Type II(111), Type III(211), Type IV(2HH), or Type V(111) construction. (See 8.2.1.)

Exception: Buildings constructed of Type II(000), Type III(200), or Type V(000), if protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

20.1.6.4 Any level below the level of exit discharge shall be separated from the level of exit discharge by not less than Type II(111), Type III(211), or Type V(111) construction. (See 8.2.1.)

Exception: Separation shall not be required for such levels if they are under the control of the ambulatory health care facility and any hazardous spaces are protected in accordance with Section 8.4.

20.1.6.5 Where new ambulatory health care facilities are located in existing buildings, the authority having jurisdiction shall be permitted to accept construction systems of lesser fire resistance than that required by 20.1.6.2 through 20.1.6.4, provided that it can be demonstrated to the authority's satisfaction that prompt evacuation of the facility can be achieved in case of fire or that the exposing occupancies and materials of construction present no threat of fire penetration from such occupancy to the ambulatory health care facility or to the collapse of the structure.

20.1.6.6 All interior walls and partitions in buildings of Type I or Type II construction shall be of noncombustible or limited-combustible materials.

20.1.6.7 All buildings with more than one level below the level of exit discharge shall have all such lower levels separated from the level of exit discharge by not less than Type II(111) construction.

20.1.7 Occupant Load. (See 38.1.7.)

SECTION 20.2 MEANS OF EGRESS REQUIREMENTS

20.2.1 General. Every aisle, passageway, corridor, exit discharge, exit location, and access shall be in accordance with Chapter 7.

Exception: As modified by 20.2.2 through 20.2.11.

20.2.2 Means of Egress Components.

20.2.2.1 Components of means of egress shall be limited to the types described in 38.2.2.

20.2.2.2 Special locking arrangements complying with 7.2.1.6 shall be permitted on exterior doors.

20.2.2.3 Any door in an exit passageway, horizontal exit, smoke barrier, stairway enclosure, or hazardous area enclosure shall be permitted to be held open only by an automatic release device that complies with 7.2.1.8.2. The required manual fire alarm system and the systems required by 7.2.1.8.2 shall be arranged to initiate the closing action of all such doors throughout the smoke compartment or throughout the entire facility.

20.2.2.4 Where doors in a stair enclosure are held open by an automatic release device as permitted in 20.2.2.3, initiation of a door-closing action on any level shall cause all doors at all levels in the stair enclosure to close.

20.2.3 Capacity of Means of Egress.

20.2.3.1 The capacity of any required means of egress shall be determined in accordance with the provisions of 38.2.3 and shall be based on its width as specified in Section 7.3.

20.2.3.2 The clear width of any corridor or passageway required for exit access shall be not less than 44 in. (112 cm).

20.2.3.3 Doors in the means of egress from diagnostic or treatment areas, such as x-ray, surgical, or physical therapy, shall provide a clear width of not less than 32 in. (81 cm).

20.2.4 Number of Exits.

20.2.4.1 Not less than two exits of the types described in 38.2.2 that are remotely located from each other shall be provided for each floor or fire section of the building.

20.2.4.2 Any room and any suite of rooms of more than 2500 ft² (232 m²) shall have not less than two exit access doors remotely located from each other.

20.2.4.3 Not less than two exits of the types described in 38.2.2 shall be accessible from each smoke compartment. Egress shall be permitted through adjacent compartments but shall not require return through the compartment of fire origin.

20.2.5 Arrangement of Means of Egress. (See 38.2.5.)

20.2.6 Travel Distance to Exits.

20.2.6.1 Travel distance shall be measured in accordance with Section 7.6.

20.2.6.2 Travel Distance. Travel distance shall be as follows:

- (1) The travel distance between any room door required as an exit access and an exit shall not exceed 100 ft (30 m).
- (2) The travel distance between any point in a room and an exit shall not exceed 150 ft (45 m).

Exception: The maximum travel distance in 20.2.6.2(1) or (2) shall be permitted to be increased by 50 ft (15 m) in buildings protected throughout by an approved automatic sprinkler system.

20.2.7 Discharge from Exits. (See 38.2.7.)

20.2.8 Illumination of Means of Egress. Means of egress shall be illuminated in accordance with Section 7.8.

20.2.9 Emergency Lighting and Essential Electrical Systems.

20.2.9.1 Emergency lighting shall be provided in accordance with Section 7.9.

20.2.9.2 Where general anesthesia or life-support equipment is used, each ambulatory health care facility shall be provided with an essential electrical system in accordance with NFPA 99, *Standard for Health Care Facilities*.

Exception No. 1: Where battery-operated equipment is provided and acceptable to the authority having jurisdiction.

Exception No. 2: This requirement shall not apply to a facility that uses life-support equipment for emergency purposes only.

20.2.10 Marking of Means of Egress. Means of egress shall have signs in accordance with Section 7.10.

20.2.11 Special Means of Egress Features. (Reserved.)

SECTION 20.3 PROTECTION

20.3.1 Protection of Vertical Openings. (See 38.3.1.)

20.3.2 Protection from Hazards. (See 38.3.2.)

20.3.2.1 Laboratories employing quantities of flammable, combustible, or hazardous materials that are considered as a severe hazard shall be protected in accordance with NFPA 99, *Standard for Health Care Facilities*.

20.3.2.2 Anesthetizing locations shall be protected in accordance with NFPA 99, *Standard for Health Care Facilities*.

20.3.3 Interior Finish. (See 38.3.3.)

20.3.4 Detection, Alarm, and Communications Systems.

20.3.4.1 General. Ambulatory health care facilities shall be provided with fire alarm systems in accordance with Section 9.6, except as modified by 20.3.4.2 through 20.3.4.5.

20.3.4.2 Initiation. Initiation of the required fire alarm systems shall be by manual means in accordance with 9.6.2 and by means of any detection devices or detection systems required.

20.3.4.3 Occupant Notification. Occupant notification shall be accomplished automatically, without delay, upon operation of any fire alarm activating device by means of an internal audible alarm in accordance with 9.6.3.

20.3.4.4 Emergency Forces Notification. Fire department notification shall be accomplished in accordance with 9.6.4.

Exception: Smoke detection devices or smoke detection systems equipped with reconfirmation features shall not be required to automatically notify the fire department unless the alarm condition is reconfirmed after a period not exceeding 120 seconds.

20.3.4.5 Emergency Control. Operation of any activating device in the required fire alarm system shall be arranged to accomplish automatically, without delay, any control functions required to be performed by that device. (See 9.6.5.)

20.3.5 Extinguishment Requirements. (See 38.3.5.)

20.3.5.1 Isolated hazardous areas shall be permitted to be protected in accordance with 9.7.1.2. Where more than two

sprinklers are installed in a single area, waterflow detection shall be provided to sound the building fire alarm, or to notify by a signal, any constantly attended location, such as PBX, security, or emergency room, at which the necessary corrective action shall be taken.

20.3.5.2 Portable fire extinguishers shall be provided in ambulatory health care facilities in accordance with 9.7.4.1.

20.3.6 Corridors.

20.3.6.1 General. (See 38.3.6.)

20.3.6.2 Openings. Miscellaneous openings such as mail slots, pharmacy pass-through windows, laboratory pass-through windows, and cashier pass-through windows shall be permitted to be installed in vision panels or doors without special protection, provided that the aggregate area of openings per room does not exceed 20 in.² (135 cm²) and the openings are installed at or below half the distance from the floor to the room ceiling.

Exception: For rooms protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 7.7, the aggregate area of openings per room shall not exceed 80 in.² (520 cm²).

20.3.7 Subdivision of Building Space.

20.3.7.1 Ambulatory health care facilities shall be separated from other tenants and occupancies by walls having not less than a 1-hour fire resistance rating. Such walls shall extend from the floor slab below to the floor or roof slab above. Doors shall be constructed of not less than 1³/₄-in. (4.4-cm) thick, solid-bonded wood core or the equivalent and shall be equipped with positive latches. These doors shall be self-closing and shall be kept in the closed position except when in use. Any vision panels shall be of fixed fire window assemblies in accordance with 8.2.3.2.2.

20.3.7.2 The ambulatory health care facility shall be divided into not less than two smoke compartments.

Exception No. 1: Facilities of less than 5000 ft² (465 m²) and protected by an approved automatic smoke detection system.

Exception No. 2: Facilities of less than 10,000 ft² (930 m²) and protected throughout by an approved, supervised automatic sprinkler system installed in accordance with Section 9.7.

Exception No. 3: An area in an adjoining occupancy shall be permitted to serve as a smoke compartment for the ambulatory health care facility if the following criteria are met:

(a) *The separating wall and both compartments meet the requirements of 20.3.7.*

(b) *The ambulatory health care facility is less than 22,500 ft² (2100 m²).*

(c) *Access from the ambulatory health care facility to the other occupancy is unrestricted.*

20.3.7.3 Any required smoke barrier shall be constructed in accordance with Section 8.3 and shall have a fire resistance rating of not less than 1 hour.

Exception: Dampers shall not be required in duct penetrations of smoke barriers in fully ducted heating, ventilating, and air conditioning systems for buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

20.3.7.4 Vision panels in the smoke barrier shall be of fixed fire window assemblies in accordance with 8.2.3.2.2.

20.3.7.5 Not less than 15 net ft² (1.4 net m²) per ambulatory health care facility occupant shall be provided within the aggregate area of corridors, patient rooms, treatment rooms, lounges, and other low hazard areas on each side of the smoke compartment for the total number of occupants in adjoining compartments. Smoke barriers shall be provided to limit the size of each smoke compartment to an area not exceeding 22,500 ft² (2100 m²) and to limit the travel distance from any point to reach a door in the required smoke barrier to 200 ft (60 m).

Exception: The area of an atrium separated in accordance with 8.2.5.6 shall not be limited in size.

20.3.7.6* Doors in smoke barriers shall be not less than 1³/₄-in. (4.4-cm) thick, solid-bonded wood core or the equivalent and shall be self-closing. A vision panel shall be required.

20.3.7.7 Doors in smoke barriers shall normally be kept closed, or, if held open, they shall be equipped with automatic devices that will release the doors upon activation of the fire alarm system and either one of the following:

- (1) A local smoke detector
- (2) A complete automatic fire-extinguishing system or complete automatic fire detection system

SECTION 20.4 SPECIAL PROVISIONS

(See Section 38.4.)

SECTION 20.5 BUILDING SERVICES

20.5.1 Utilities. Utilities shall comply with the provisions of Section 9.1.

20.5.2 Heating, Ventilating, and Air Conditioning.

20.5.2.1 Heating, ventilating, and air conditioning shall comply with the provisions of Section 9.2 and shall be in accordance with the manufacturer's specifications.

Exception: As modified in 20.5.2.2.

20.5.2.2 Any heating device, other than a central heating plant, shall be designed and installed so that combustible material will not be ignited by the device or its appurtenances. If fuel-fired, such heating devices shall be chimney connected or vent connected, shall take air for combustion directly from the outside, and shall be designed and installed to provide for complete separation of the combustion system from the atmosphere of the occupied area. Any heating device shall have safety features to immediately stop the flow of fuel and shut down the equipment in case of either excessive temperature or ignition failure.

Exception: Approved, suspended unit heaters shall be permitted in locations other than means of egress and patient treatment areas, provided that such heaters are located high enough to be out of the reach of persons using the area and are equipped with the safety features required by 20.5.2.2.

20.5.3 Elevators, Escalators, and Conveyors. Elevators, escalators, and conveyors shall comply with the provisions of Section 9.4.

20.5.4 Rubbish Chutes, Incinerators, and Laundry Chutes. Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 9.5.

SECTION 20.6 RESERVED

SECTION 20.7* OPERATING FEATURES

20.7.1 Evacuation and Relocation Plan and Fire Drills.

20.7.1.1 The administration of every ambulatory health care facility shall have, in effect and available to all supervisory personnel, written copies of a plan for the protection of all persons in the event of fire, for their evacuation to areas of refuge, and for their evacuation from the building when necessary. All employees shall be periodically instructed and kept informed with respect to their duties under the plan. A copy of the plan shall be readily available at all times in the telephone operator's position or at the security center.

The provisions of 20.7.1.2 through 20.7.2.3 shall apply.

20.7.1.2* Fire drills in ambulatory health care facilities shall include the transmission of a fire alarm signal and simulation of emergency fire conditions. Drills shall be conducted quarterly on each shift to familiarize facility personnel (nurses, interns, maintenance engineers, and administrative staff) with the signals and emergency action required under varied conditions. When drills are conducted between 9:00 p.m. (2100 hours) and 6:00 a.m. (0600 hours), a coded announcement shall be permitted to be used instead of audible alarms.

Exception: Infirm or bedridden patients shall not be required to be moved during drills to safe areas or to the exterior of the building.

20.7.1.3 Employees of ambulatory health care facilities shall be instructed in life safety procedures and devices.

20.7.2 Procedure in Case of Fire.

20.7.2.1* For ambulatory health care facilities, the proper protection of patients shall require the prompt and effective response of ambulatory health care personnel. The basic response required of staff shall include the removal of all occupants directly involved with the fire emergency, transmission of an appropriate fire alarm signal to warn other building occupants and summon staff, confinement of the effects of the fire by closing doors to isolate the fire area, and the relocation of patients as detailed in the facility's fire safety plan.

20.7.2.2 A written fire safety plan shall provide for the following:

- (1) Use of alarms
- (2) Transmission of alarm to fire department
- (3) Response to alarms
- (4) Isolation of fire
- (5) Evacuation of immediate area
- (6) Evacuation of smoke compartment
- (7) Preparation of floors and building for evacuation
- (8) Extinguishment of fire

20.7.2.3 All personnel shall be instructed in the use of and response to fire alarms. In addition, they shall be instructed in the use of the code phrase to ensure transmission of an alarm under the following conditions:

- (1) When the individual who discovers a fire must immediately go to the aid of an endangered person
- (2) During a malfunction of the building fire alarm system

Personnel hearing the code announced shall first activate the building fire alarm using the nearest fire alarm box and then shall execute immediately their duties as outlined in the fire safety plan.

20.7.3 Maintenance of Exits. Proper maintenance shall be provided to ensure the dependability of the method of evacuation selected. Ambulatory health care occupancies that find it necessary to lock exits shall, at all times, maintain an adequate staff qualified to release locks and direct occupants from the immediate danger area to a place of safety in case of fire or other emergency.

20.7.4* Smoking. Smoking regulations shall be adopted and shall include not less than the following provisions:

- (1) Smoking shall be prohibited in any room, ward, or compartment where flammable liquids, combustible gases, or oxygen is used or stored and in any other hazardous location, and such areas shall be posted with signs that read NO SMOKING or shall be posted with the international symbol for no smoking.

Exception: The requirement of 20.7.4(1) shall not apply where smoking is prohibited and signs are prominently placed at all major entrances, secondary signs with language that prohibits smoking shall not be required.

- (2) Smoking by patients classified as not responsible shall be prohibited.

Exception: The requirement of 20.7.4(2) shall not apply where the patient is under direct supervision.

- (3) Ashtrays of noncombustible material and safe design shall be provided in all areas where smoking is permitted.
- (4) Metal containers with self-closing cover devices into which ashtrays can be emptied shall be readily available to all areas where smoking is permitted.

20.7.5 Furnishings, Bedding, and Decorations.

20.7.5.1* Draperies, curtains, including cubicle curtains, and other loosely hanging fabrics and films serving as furnishings or decorations in ambulatory health care occupancies shall be in accordance with the provisions of 10.3.1.

Exception: Curtains at showers.

20.7.5.2 Newly introduced upholstered furniture shall meet the criteria specified when tested in accordance with the methods cited in 10.3.2(2) and 10.3.3.

20.7.5.3 Newly introduced mattresses shall meet the criteria specified when tested in accordance with the methods cited in 10.3.2(3) and 10.3.4.

20.7.5.4 Combustible decorations shall be prohibited unless they are flame-retardant.

Exception: Combustible decorations, such as photographs and paintings, in such limited quantities that a hazard of fire development or spread is not present.

20.7.5.5 Soiled linen or trash collection receptacles shall not exceed 32 gal (121 L) in capacity. The average density of container capacity in a room or space shall not exceed 0.5 gal/ft² (20.4 L/m²). A capacity of 32 gal (121 L) shall not be exceeded within any 64-ft² (5.9-m²) area. Mobile soiled linen or trash collection receptacles with capacities greater than 32 gal (121 L) shall be located in a room protected as a hazardous area when not attended.

Exception: Container size and density shall not be limited in hazardous areas.

20.7.6 Maintenance and Testing. (See 4.6.12.)

20.7.7* Engineered Smoke Control Systems. New engineered smoke control systems shall be tested in accordance with established engineering principles and shall meet the performance requirements of such testing prior to acceptance. Following acceptance, all engineered smoke control systems shall be tested periodically in accordance with recognized engineering principles. Test documentation shall be maintained on the premises at all times.

20.7.8 Portable Space-Heating Devices. Portable space-heating devices shall be prohibited.

Exception: Portable space-heating devices shall be permitted to be used in nonsleeping staff and employee areas where the heating elements of such devices do not exceed 212°F (100°C).

20.7.9 Construction, Repair, and Improvement Operations.

20.7.9.1 Construction, repair, and improvement operations shall comply with 4.6.10.

20.7.9.2 The means of egress in any area undergoing construction, repair, or improvements shall be inspected daily for compliance with 7.1.10.1 and shall also comply with NFPA 241, *Standard for Safeguarding Construction, Alteration, and Demolition Operations*.

Chapter 21 EXISTING AMBULATORY HEALTH CARE OCCUPANCIES

SECTION 21.1 GENERAL REQUIREMENTS

21.1.1 Application.

21.1.1.1 General.

21.1.1.1.1 The requirements of this chapter apply to existing buildings or portions thereof currently occupied as an ambulatory health care occupancy. (See also 20.1.1.1.1.)

21.1.1.1.2 Ambulatory health care facilities shall comply with the provisions of Chapter 39 and this chapter, whichever is more stringent.

21.1.1.1.3 This chapter establishes life safety requirements, in addition to those required in Chapter 39, for the design of all ambulatory health care occupancies as defined in 3.3.8.

21.1.1.1.4 Buildings, or sections of buildings, that primarily house patients who, in the opinion of the governing body of the facility and the governmental agency having jurisdiction, are capable of judgment and appropriate physical action for self-preservation under emergency conditions shall be permitted to comply with chapters of this *Code* other than Chapter 21.

21.1.1.1.5 It shall be recognized that, in buildings providing treatment for certain types of patients or having detention rooms or a security section, it might be necessary to lock doors and bar windows to confine and protect building inhabitants. In such instances, the authority having jurisdiction shall make appropriate modifications to those sections of this *Code* that would otherwise require means of egress to be kept unlocked.

21.1.1.1.6* The requirements of this chapter are based on the assumption that staff is available in all patient-occupied areas to perform certain fire safety functions as required in other paragraphs of this chapter.

21.1.1.1.2* Goals and Objectives. The goals and objectives of Sections 4.1 and 4.2 shall be met with due consideration for functional requirements. This is accomplished by limiting the development and spread of a fire emergency to the room of fire origin and reducing the need for occupant evacuation, except from the room of fire origin.

21.1.1.1.3 Total Concept. All ambulatory health care facilities shall be designed, constructed, maintained, and operated to minimize the possibility of a fire emergency requiring the evacuation of occupants. Because the safety of ambulatory health care occupants cannot be ensured adequately by dependence on evacuation of the building, their protection from fire shall be provided by appropriate arrangement of facilities, adequate, trained staff, and development of operating and maintenance procedures composed of the following:

- (1) Design, construction, and compartmentation
- (2) Provision for detection, alarm, and extinguishment
- (3) Fire prevention and the planning, training, and drilling programs for the isolation of fire, transfer of occupants to areas of refuge, or evacuation of the building

21.1.1.1.4 Additions, Conversions, Modernization, Renovation, and Construction Operations.

21.1.1.1.4.1 Additions. Additions shall be separated from any existing structure not conforming to the provisions within Chapter 21 by a fire barrier having not less than a 2-hour fire

resistance rating and constructed of materials as required for the addition. (See 4.6.3 and 4.6.6.)

21.1.1.4.2 Communicating openings in dividing fire barriers required by 21.1.1.4.1 shall be permitted only in corridors and shall be protected by approved self-closing fire doors. (See also Section 8.2.)

21.1.1.4.3 Doors in barriers required by 21.1.1.4.1 shall normally be kept closed.

Exception: Doors shall be permitted to be held open if they meet the requirements of 21.2.2.3.

21.1.1.4.4 Changes of Occupancy. A change from a hospital or nursing home to an ambulatory health care occupancy shall not be considered a change in occupancy or occupancy sub-classification.

21.1.1.4.5 Renovations, Alterations, and Modernizations. (See 4.6.7.)

21.1.1.4.6 Construction, Repair, and Improvement Operations. (See 4.6.10.)

21.1.2 Mixed Occupancies. (See also 6.1.14.)

21.1.2.1* Sections of ambulatory health care facilities shall be permitted to be classified as other occupancies, provided that they meet all of the following conditions:

- (1) They are not intended to serve ambulatory health care occupants for purposes of treatment or customary access by patients incapable of self-preservation.
- (2) They are separated from areas of ambulatory health care occupancies by construction having a fire resistance rating of not less than 1 hour.

21.1.2.2 All means of egress from ambulatory health care occupancies that traverse nonambulatory health care spaces shall conform to the requirements of this *Code* for ambulatory health care occupancies.

Exception: Exit through a horizontal exit into other contiguous occupancies that do not conform with ambulatory health care egress provisions, but that do comply with requirements set forth in the appropriate occupancy chapter of this Code, shall be permitted, provided that the occupancy does not contain high hazard contents.

21.1.2.3 Egress provisions for areas of ambulatory health care facilities that correspond to other occupancies shall meet the corresponding requirements of this *Code* for such occupancies. Where the clinical needs of the occupant necessitate the locking of means of egress, staff shall be present for the supervised release of occupants during all times of use.

21.1.2.4 Any area with a hazard of contents classified higher than that of the ambulatory health care occupancy and located in the same building shall be protected as required in 21.3.2.

21.1.2.5 Non-health care-related occupancies classified as containing high hazard contents shall not be permitted in buildings housing ambulatory health care occupancies.

21.1.3 Special Definitions.

Ambulatory Health Care Occupancy. See 3.3.8.

21.1.4 Classification of Occupancy. (See 21.1.3.)

21.1.5 Classification of Hazard of Contents. The classification of hazard of contents shall be as defined in Section 6.2.

21.1.6 Minimum Construction Requirements.

21.1.6.1 For the purposes of 21.1.6, the number of stories shall be counted starting with the primary level of exit discharge and ending with the highest occupiable level. For the purposes of 21.1.6, the primary level of exit discharge of a building shall be that floor that is level with or above finished grade of the exterior wall line for 50 percent or more of its perimeter.

21.1.6.2 Buildings of one story in height housing ambulatory health care facilities shall be of any construction type in accordance with NFPA 220, *Standard on Types of Building Construction*. (See 8.2.1.)

21.1.6.3 Buildings of two or more stories in height housing ambulatory health care facilities shall be of Type I(443), Type I(332), Type II(222), Type II(111), Type III(211), Type IV(2HH), or Type V(111) construction. (See 8.2.1.)

Exception: Buildings constructed of Type II(000), Type III(200), or Type V(000), if protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

21.1.6.4 Any level below the level of exit discharge shall be separated from the level of exit discharge by not less than Type II(111), Type III(211), or Type V(111) construction. (See 8.2.1.)

Exception: Separation shall not be required for such levels if they are under the control of the ambulatory health care facility and any hazardous spaces are protected in accordance with Section 8.4.

21.1.6.5 In existing buildings, the authority having jurisdiction shall be permitted to accept construction systems of lesser fire resistance than that required by 21.1.6.2 through 21.1.6.4, provided that it can be demonstrated to the authority's satisfaction that prompt evacuation of the facility can be achieved in case of fire or that the exposing occupancies and materials of construction present no threat of fire penetration from such occupancy to the ambulatory health care facility or to the collapse of the structure.

21.1.6.6 All interior walls and partitions in buildings of Type I or Type II construction shall be of noncombustible or limited-combustible materials.

21.1.6.7 All buildings with more than one level below the level of exit discharge shall have all such lower levels separated from the level of exit discharge by not less than Type II(111) construction.

21.1.7 Occupant Load. (See 39.1.7.)

SECTION 21.2 MEANS OF EGRESS REQUIREMENTS

21.2.1 General. Every aisle, passageway, corridor, exit discharge, exit location, and access shall be in accordance with Chapter 7.

Exception: As modified by 21.2.2 through 21.2.11.

21.2.2 Means of Egress Components.

21.2.2.1 Components of means of egress shall be limited to the types described in 39.2.2.

21.2.2.2 Special locking arrangements complying with 7.2.1.6 shall be permitted on exterior doors.

21.2.2.3 Any door in an exit passageway, horizontal exit, smoke barrier, stairway enclosure, or hazardous area enclosure shall be permitted to be held open only by an automatic

release device that complies with 7.2.1.8.2. The required manual fire alarm system and the systems required by 7.2.1.8.2 shall be arranged to initiate the closing action of all such doors throughout the smoke compartment or throughout the entire facility.

21.2.2.4 Where doors in a stair enclosure are held open by an automatic release device as permitted in 21.2.2.3, initiation of a door-closing action on any level shall cause all doors at all levels in the stair enclosure to close.

21.2.3 Capacity of Means of Egress.

21.2.3.1 The capacity of any required means of egress shall be determined in accordance with the provisions of 39.2.3 and shall be based on its width as specified in Section 7.3.

21.2.3.2 The clear width of any corridor or passageway required for exit access shall be not less than 44 in. (112 cm).

21.2.3.3 Doors in the means of egress from diagnostic or treatment areas, such as x-ray, surgical, or physical therapy, shall provide a clear width of not less than 32 in. (81 cm).

Exception: Existing 34-in. (86-cm) doors.

21.2.4 Number of Exits.

21.2.4.1 Not less than two exits of the types described in 39.2.2 that are remotely located from each other shall be provided for each floor or fire section of the building.

21.2.4.2 Any room and any suite of rooms of more than 2500 ft² (232 m²) shall have not less than two exit access doors remotely located from each other.

21.2.4.3 Not less than two exits of the types described in 39.2.2 shall be accessible from each smoke compartment. Egress shall be permitted through adjacent compartments but shall not require return through the compartment of fire origin.

21.2.5 Arrangement of Means of Egress. (See 39.2.5.)

21.2.6 Travel Distance to Exits.

21.2.6.1 Travel distance shall be measured in accordance with Section 7.6.

21.2.6.2 Travel Distance. Travel distance shall be as follows:

- (1) The travel distance between any room door required as an exit access and an exit shall not exceed 100 ft (30 m).
- (2) The travel distance between any point in a room and an exit shall not exceed 150 ft (45 m).

Exception: The maximum travel distance in 21.2.6.2(1) or (2) shall be permitted to be increased by 50 ft (15 m) in buildings protected throughout by an approved automatic sprinkler system.

21.2.7 Discharge from Exits. (See 39.2.7.)

21.2.8 Illumination of Means of Egress. Means of egress shall be illuminated in accordance with Section 7.8.

21.2.9 Emergency Lighting and Essential Electrical Systems.

21.2.9.1 Emergency lighting shall be provided in accordance with Section 7.9.

21.2.9.2 Where general anesthesia or life-support equipment is used, each ambulatory health care facility shall be provided with an essential electrical system in accordance with NFPA 99, *Standard for Health Care Facilities*.

Exception No. 1: Where battery-operated equipment is provided and acceptable to the authority having jurisdiction.

Exception No. 2: This requirement shall not apply to a facility that uses life-support equipment for emergency purposes only.

21.2.10 Marking of Means of Egress. Means of egress shall have signs in accordance with Section 7.10.

21.2.11 Special Means of Egress Features. (Reserved.)

SECTION 21.3 PROTECTION

21.3.1 Protection of Vertical Openings. (See 39.3.1.)

21.3.2 Protection from Hazards. (See 39.3.2.)

21.3.2.1 Laboratories employing quantities of flammable, combustible, or hazardous materials that are considered as a severe hazard shall be protected in accordance with NFPA 99, *Standard for Health Care Facilities*.

21.3.2.2 Anesthetizing locations shall be protected in accordance with NFPA 99, *Standard for Health Care Facilities*.

21.3.3 Interior Finish. (See 39.3.3.)

21.3.4 Detection, Alarm, and Communications Systems.

21.3.4.1 General. Ambulatory health care facilities shall be provided with fire alarm systems in accordance with Section 9.6, except as modified by 21.3.4.2 through 21.3.4.5.

21.3.4.2 Initiation. Initiation of the required fire alarm systems shall be by manual means in accordance with 9.6.2 and by means of any detection devices or detection systems required.

21.3.4.3 Occupant Notification. Occupant notification shall be accomplished automatically, without delay, upon operation of any fire alarm activating device by means of an internal audible alarm in accordance with 9.6.3.

21.3.4.4 Emergency Forces Notification. Fire department notification shall be accomplished in accordance with 9.6.4.

Exception: Smoke detection devices or smoke detection systems equipped with reconfirmation features shall not be required to automatically notify the fire department unless the alarm condition is reconfirmed after a period not exceeding 120 seconds.

21.3.4.5 Emergency Control. Operation of any activating device in the required fire alarm system shall be arranged to accomplish automatically, without delay, any control functions required to be performed by that device. (See 9.6.5.)

21.3.5 Extinguishment Requirements. (See 39.3.5.)

21.3.5.1 Isolated hazardous areas shall be permitted to be protected in accordance with 9.7.1.2. For new installations in existing ambulatory health care facilities, where more than two sprinklers are installed in a single area, waterflow detection shall be provided to sound the building fire alarm, or to notify by a signal, any constantly attended location, such as PBX, security, or emergency room, at which the necessary corrective action shall be taken.

21.3.5.2 Portable fire extinguishers shall be provided in ambulatory health care facilities in accordance with 9.7.4.1.

21.3.6 Corridors. (No requirements.)

21.3.7 Subdivision of Building Space.

21.3.7.1 Ambulatory health care facilities shall be separated from other tenants and occupancies by walls having not less than a 1-hour fire resistance rating. Such walls shall extend from the floor slab below to the floor or roof slab above. Doors

shall be constructed of not less than 1³/₄-in. (4.4-cm) thick, solid-bonded wood core or the equivalent and shall be equipped with positive latches. These doors shall be self-closing and shall be kept in the closed position except when in use. Any vision panels shall be of fixed fire window assemblies in accordance with 8.2.3.2.2.

21.3.7.2 The ambulatory health care facility shall be divided into not less than two smoke compartments.

Exception No. 1: Facilities of less than 5000 ft² (465 m²) and protected by an approved automatic smoke detection system.

Exception No. 2: Facilities of less than 10,000 ft² (930 m²) and protected throughout by an approved, supervised automatic sprinkler system installed in accordance with Section 9.7.

Exception No. 3: An area in an adjoining occupancy shall be permitted to serve as a smoke compartment for the ambulatory health care facility if the following criteria are met:

(a) *The separating wall and both compartments meet the requirements of 21.3.7.*

(b) *The ambulatory health care facility is less than 22,500 ft² (2100 m²).*

(c) *Access from the ambulatory health care facility to the other occupancy is unrestricted.*

21.3.7.3 Any required smoke barrier shall be constructed in accordance with Section 8.3 and shall have a fire resistance rating of not less than 1 hour.

Exception: Dampers shall not be required in duct penetrations of smoke barriers in fully ducted heating, ventilating, and air conditioning systems for buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

21.3.7.4 Vision panels in the smoke barrier shall be of fixed fire window assemblies in accordance with 8.2.3.2.2.

21.3.7.5 (Reserved.)

21.3.7.6* Doors in smoke barriers shall be not less than 1³/₄-in. (4.4-cm) thick, solid-bonded wood core or the equivalent and shall be self-closing. A vision panel shall be required.

21.3.7.7 Doors in smoke barriers shall normally be kept closed, or, if held open, they shall be equipped with automatic devices that will release the doors upon activation of the fire alarm system and either one of the following:

- (1) A local smoke detector
- (2) A complete automatic fire-extinguishing system or complete automatic fire detection system

SECTION 21.4 SPECIAL PROVISIONS

(See Section 39.4.)

SECTION 21.5 BUILDING SERVICES

21.5.1 Utilities. Utilities shall comply with the provisions of Section 9.1.

Exception: Existing installations shall be permitted to be continued in service, provided that the systems do not present a serious hazard to life.

21.5.2 Heating, Ventilating, and Air Conditioning.

21.5.2.1 Heating, ventilating, and air conditioning shall comply with the provisions of Section 9.2 and shall be in accordance with the manufacturer's specifications.

Exception: As modified in 21.5.2.2.

21.5.2.2 Any heating device, other than a central heating plant, shall be designed and installed so that combustible material will not be ignited by the device or its appurtenances. If fuel-fired, such heating devices shall be chimney connected or vent connected, shall take air for combustion directly from the outside, and shall be designed and installed to provide for complete separation of the combustion system from the atmosphere of the occupied area. Any heating device shall have safety features to immediately stop the flow of fuel and shut down the equipment in case of either excessive temperature or ignition failure.

Exception: Approved, suspended unit heaters shall be permitted in locations other than means of egress and patient treatment areas, provided that such heaters are located high enough to be out of the reach of persons using the area and are equipped with the safety features required by 21.5.2.2.

21.5.3 Elevators, Escalators, and Conveyors. Elevators, escalators, and conveyors shall comply with the provisions of Section 9.4.

21.5.4 Rubbish Chutes, Incinerators, and Laundry Chutes. Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 9.5.

SECTION 21.6 RESERVED

SECTION 21.7* OPERATING FEATURES

21.7.1 Evacuation and Relocation Plan and Fire Drills.

21.7.1.1 The administration of every ambulatory health care facility shall have, in effect and available to all supervisory personnel, written copies of a plan for the protection of all persons in the event of fire, for their evacuation to areas of refuge, and for their evacuation from the building when necessary. All employees shall be periodically instructed and kept informed with respect to their duties under the plan. A copy of the plan shall be readily available at all times in the telephone operator's position or at the security center.

The provisions of 21.7.1.2 through 21.7.2.3 shall apply.

21.7.1.2* Fire drills in ambulatory health care facilities shall include the transmission of a fire alarm signal and simulation of emergency fire conditions. Drills shall be conducted quarterly on each shift to familiarize facility personnel (nurses, interns, maintenance engineers, and administrative staff) with the signals and emergency action required under varied conditions. When drills are conducted between 9:00 p.m. (2100 hours) and 6:00 a.m. (0600 hours), a coded announcement shall be permitted to be used instead of audible alarms.

Exception: Infirm or bedridden patients shall not be required to be moved during drills to safe areas or to the exterior of the building.

21.7.1.3 Employees of ambulatory health care facilities shall be instructed in life safety procedures and devices.

21.7.2 Procedure in Case of Fire.

21.7.2.1* For ambulatory health care facilities, the proper protection of patients shall require the prompt and effective response of ambulatory health care personnel. The basic response required of staff shall include the removal of all occupants directly involved with the fire emergency, transmission of an appropriate fire alarm signal to warn other building occupants and summon staff, confinement of the effects of the fire by closing doors to isolate the fire area, and the relocation of patients as detailed in the facility's fire safety plan.

21.7.2.2 A written fire safety plan shall provide for the following:

- (1) Use of alarms
- (2) Transmission of alarm to fire department
- (3) Response to alarms
- (4) Isolation of fire
- (5) Evacuation of immediate area
- (6) Evacuation of smoke compartment
- (7) Preparation of floors and building for evacuation
- (8) Extinguishment of fire

21.7.2.3 All personnel shall be instructed in the use of and response to fire alarms. In addition, they shall be instructed in the use of the code phrase to ensure transmission of an alarm under the following conditions:

- (1) When the individual who discovers a fire must immediately go to the aid of an endangered person
- (2) During a malfunction of the building fire alarm system

Personnel hearing the code announced shall first activate the building fire alarm using the nearest fire alarm box and then shall execute immediately their duties as outlined in the fire safety plan.

21.7.3 Maintenance of Exits. Proper maintenance shall be provided to ensure the dependability of the method of evacuation selected. Ambulatory health care occupancies that find it necessary to lock exits shall, at all times, maintain an adequate staff qualified to release locks and direct occupants from the immediate danger area to a place of safety in case of fire or other emergency.

21.7.4* Smoking. Smoking regulations shall be adopted and shall include not less than the following provisions:

- (1) Smoking shall be prohibited in any room, ward, or compartment where flammable liquids, combustible gases, or oxygen is used or stored and in any other hazardous location, and such areas shall be posted with signs that read NO SMOKING or shall be posted with the international symbol for no smoking.

Exception: The requirement of 21.7.4(2) shall not apply where smoking is prohibited and signs are prominently placed at all major entrances, secondary signs with language that prohibits smoking shall not be required.

- (2) Smoking by patients classified as not responsible shall be prohibited.

Exception: The requirement of 21.7.4(2) shall not apply where the patient is under direct supervision.

- (3) Ashtrays of noncombustible material and safe design shall be provided in all areas where smoking is permitted.
- (4) Metal containers with self-closing cover devices into which ashtrays can be emptied shall be readily available to all areas where smoking is permitted.

21.7.5 Furnishings, Bedding, and Decorations.

21.7.5.1* Draperies, curtains, including cubicle curtains, and other loosely hanging fabrics and films serving as furnishings or decorations in ambulatory health care occupancies shall be in accordance with the provisions of 10.3.1.

Exception: Curtains at showers.

21.7.5.2 Newly introduced upholstered furniture shall meet the criteria specified when tested in accordance with the methods cited in 10.3.2(2) and 10.3.3.

21.7.5.3 Newly introduced mattresses shall meet the criteria specified when tested in accordance with the methods cited in 10.3.2(3) and 10.3.4.

21.7.5.4 Combustible decorations shall be prohibited unless they are flame-retardant.

Exception: Combustible decorations, such as photographs and paintings, in such limited quantities that a hazard of fire development or spread is not present.

21.7.5.5 Soiled linen or trash collection receptacles shall not exceed 32 gal (121 L) in capacity. The average density of container capacity in a room or space shall not exceed 0.5 gal/ft² (20.4 L/m²). A capacity of 32 gal (121 L) shall not be exceeded within any 64-ft² (5.9-m²) area. Mobile soiled linen or trash collection receptacles with capacities greater than 32 gal (121 L) shall be located in a room protected as a hazardous area when not attended.

Exception: Container size and density shall not be limited in hazardous areas.

21.7.6 Maintenance and Testing. (See 4.6.12.)

21.7.7* Engineered Smoke Control Systems. New engineered smoke control systems shall be tested in accordance with estab-

lished engineering principles and shall meet the performance requirements of such testing prior to acceptance. Following acceptance, all engineered smoke control systems shall be tested periodically in accordance with recognized engineering principles. Test documentation shall be maintained on the premises at all times.

21.7.8 Portable Space-Heating Devices. Portable space-heating devices shall be prohibited.

Exception: Portable space-heating devices shall be permitted to be used in nonsleeping staff and employee areas where the heating elements of such devices do not exceed 212°F (100°C).

21.7.9 Construction, Repair, and Improvement Operations.

21.7.9.1 Construction, repair, and improvement operations shall comply with 4.6.10.

21.7.9.2 The means of egress in any area undergoing construction, repair, or improvements shall be inspected daily for compliance with 7.1.10.1 and shall also comply with NFPA 241, *Standard for Safeguarding Construction, Alteration, and Demolition Operations*.

Chapter 22 NEW DETENTION AND CORRECTIONAL OCCUPANCIES

SECTION 22.1 GENERAL REQUIREMENTS

22.1.1 Application.

22.1.1.1 The requirements of this chapter apply to the following:

- (1) New buildings or portions thereof used as detention or correctional occupancies (*see 1.4.1*)
- (2) Additions made to, or used as, a detention or correctional occupancy (*see 4.6.6 and 22.1.1.6*)
- (3) Alterations, modernizations, or renovations of existing detention or correctional occupancies (*see 4.6.7 and 22.1.1.7*)
- (4) Existing buildings or portions thereof upon change of occupancy to a detention or correctional occupancy (*see 4.6.11*)

22.1.1.2 This chapter establishes life safety requirements for the design of all new detention and correctional facilities.

Exception No. 1: Use Condition I facilities protected as residential occupancies in accordance with 22.1.4.3.

Exception No. 2: Facilities determined to have equivalent safety provided in accordance with Section 1.5.*

22.1.1.3 Detention and correctional occupancies shall include those used for purposes such as correctional institutions, detention facilities, community residential centers, training schools, work camps, and substance abuse centers where occupants are confined or housed under some degree of restraint or security.

22.1.1.4 Detention and correctional occupancies provide sleeping facilities for four or more residents and are occupied by persons who are generally prevented from taking self-preservation action because of security measures not under the occupants' control.

22.1.1.5 Total Concept. All detention and correctional facilities shall be designed, constructed, maintained, and operated to minimize the possibility of a fire emergency. Because the safety of all occupants in detention and correctional facilities cannot be adequately ensured solely by dependence on evacuation of the building, their protection from fire shall be provided by appropriate arrangement of facilities; adequate, trained staff; and development of operating, security, and maintenance procedures composed of the following:

- (1) Design, construction, and compartmentation
- (2) Provision for detection, alarm, and extinguishment
- (3) Fire prevention and planning, training, and drilling programs for the isolation of fire and the transfer of occupants to areas of refuge, for evacuation of the building, or for protection of the occupants in place
- (4) Provision of security to the degree necessary for the safety of the public and the occupants of the facility

22.1.1.6 Additions. Additions shall be separated from any existing structure not conforming with the provisions of Chapter 23 by a fire barrier having not less than a 2-hour fire resistance rating constructed to the requirements of the addition. Doors in these partitions shall normally be kept closed.

Exception: Doors shall be permitted to be held open if they meet the requirements of the exception to 7.2.1.8.

22.1.1.7 Modernizations or Renovations. Modernizations and renovations shall be in accordance with 4.6.7.

Exception: In nonsprinklered existing buildings, modernizations or renovations shall be permitted to comply with the nonsprinklered options contained in 22.4.4 in lieu of the sprinkler requirement of 22.3.5.2.

22.1.2* Mixed Occupancies. (*See also 6.1.14.*)

22.1.2.1* Egress provisions for areas of detention and correctional facilities that correspond to other occupancies shall meet the corresponding requirements of this *Code* for such occupancies. Where security operations necessitate the locking of required means of egress, staff shall be provided for the supervised release of occupants during all times of use.

22.1.2.2 Sections of detention and correctional facilities shall be permitted to be classified as other occupancies, provided that they meet all of the following conditions:

- (1) They are not intended to serve residents for sleeping purposes.
- (2) They are separated from areas of detention or correctional occupancies by construction having not less than a 2-hour fire resistance rating.

22.1.2.3 Detention and correctional occupancies in buildings housing other occupancies shall be completely separated from the other occupancies by construction having not less than a 2-hour fire resistance rating, as provided for additions in 22.1.1.6.

22.1.2.4 All means of egress from detention and correctional occupancies that traverse other use areas shall, as a minimum, conform to the requirements of this *Code* for detention and correctional occupancies.

Exception: Egress through a horizontal exit into other contiguous occupancies that do not conform to detention and correctional occupancy egress provisions, but that do comply with requirements set forth in the appropriate occupancy chapter of this Code, shall be permitted, provided that the occupancy does not contain high hazard contents. The horizontal exit shall comply with the requirements of 22.2.2.5.

22.1.2.5 Any area with a hazard of contents classified higher than that of the detention or correctional occupancy and located in the same building shall be protected as required in 22.3.2.

22.1.2.6 Nondetention- or noncorrectional-related occupancies classified as containing high hazard contents shall not be permitted in buildings housing detention or correctional occupancies.

22.1.3 Special Definitions.

Detention and Correctional Residential Housing Area. See 3.3.45.

Sally Port (Security Vestibule). See 3.3.170.

22.1.4 Classification of Occupancy.

22.1.4.1* For application of the life safety requirements of this chapter, the resident user category shall be divided into the following five groups.

(a) *Use Condition I — Free Egress.* Free movement is allowed from sleeping areas and other spaces where access or occupancy is permitted to the exterior via means of egress that meet the requirements of the *Code*.

(b) *Use Condition II — Zoned Egress.* Free movement is allowed from sleeping areas and any other occupied smoke compartment to one or more other smoke compartments.

(c) *Use Condition III — Zoned Impeded Egress.* Free movement is allowed within individual smoke compartments, such as within a residential unit comprised of individual sleeping rooms and a group activity space, with egress impeded by remote-controlled release of means of egress from such a smoke compartment to another smoke compartment.

(d) *Use Condition IV — Impeded Egress.* Free movement is restricted from an occupied space. Remote-controlled release is provided to allow movement from all sleeping rooms, activity spaces, and other occupied areas within the smoke compartment to another smoke compartment.

(e) *Use Condition V — Contained.* Free movement is restricted from an occupied space. Staff-controlled manual release at each door is provided to allow movement from all sleeping rooms, activity spaces, and other occupied areas within the smoke compartment to another smoke compartment.

22.1.4.2* To be classified as Use Condition III or Use Condition IV, the arrangement, accessibility, and security of the release mechanism(s) used for emergency egress shall be such that the minimum available staff, at any time, can promptly release the locks.

22.1.4.3 Areas housing occupancies corresponding to Use Condition I shall conform to the requirements of residential occupancies under this *Code*.

*Exception:** Use Condition I facilities shall be permitted to conform to the requirements of this chapter for Use Condition II facilities, provided that the staffing requirements of Section 22.7 are met.

22.1.5 Classification of Hazard of Contents. The classification of hazard of contents shall be as defined in Section 6.2.

22.1.6 Minimum Construction Requirements.

22.1.6.1 For the purposes of 22.1.6, the number of stories shall be counted starting with the primary level of exit discharge. For the purposes of 22.1.6, the primary level of exit discharge of a building shall be that floor that is level with or above finished grade on the exterior wall line for 50 percent or more of its perimeter. Building levels below the primary

level shall not be counted as a story in determining the height of the building.

22.1.6.2 (Reserved.)

22.1.6.3 Detention and correctional occupancies shall be limited to the types of building construction permitted by Table 22.1.6.3. (See 8.2.1.)

22.1.6.4 All interior walls and partitions in Type I or Type II construction shall be of noncombustible or limited-combustible materials.

22.1.7 Occupant Load. The occupant load, in number of persons for whom means of egress and other provisions are required, shall be determined on the basis of the occupant load factors of Table 7.3.1.2 that are characteristic of the use of the space or shall be determined as the maximum probable population of the space under consideration, whichever is greater.

SECTION 22.2 MEANS OF EGRESS REQUIREMENTS

22.2.1 General. Means of egress shall comply with Chapter 7. *Exception: As otherwise provided or modified in Section 22.2.*

22.2.2 Means of Egress Components.

22.2.2.1 Components of means of egress shall be limited to the types described in 22.2.2.2 through 22.2.2.11.

22.2.2.2 Doors. Doors complying with 7.2.1 shall be permitted.

Exception: As provided in 22.2.11.

22.2.2.3 Stairs.

22.2.2.3.1 Stairs complying with 7.2.2 shall be permitted.

Exception: Noncombustible grated stair treads and landing floors shall be permitted.

22.2.2.3.2 Spiral stairs complying with 7.2.2.2.3 shall be permitted for access to and between staff locations.

22.2.2.4 Smokeproof Enclosures. Smokeproof enclosures complying with 7.2.3 shall be permitted.

Table 22.1.6.3 Construction Type Limitations

Type of Construction	1 Story with Basement	1 Story without Basement	2 Stories	3 Stories	>3 Stories and Not High-Rise	High-Rise
I(443)	X	X	X	X	X	X
I(332)	X	X	X	X	X	X
II(222)	X	X	X	X	X	X
II(111)	X	X	X	NP	NP	NP
III(211)	X	X	X	NP	NP	NP
IV(2HH)	X	X	X	NP	NP	NP
V(111)	X	X	X	NP	NP	NP
II(000)	X	X	X	NP	NP	NP
III(200)	X	X	X	NP	NP	NP
V(000)	X	X	X	NP	NP	NP

X: Permitted types of construction.

NP: Not permitted.

22.2.2.5 Horizontal Exits. Horizontal exits complying with 7.2.4 and the modifications of 22.2.2.5.1 through 22.2.2.5.2 shall be permitted.

22.2.2.5.1 Not less than 6 ft² (0.56 m²) of accessible space per occupant shall be provided on each side of the horizontal exit for the total number of people in adjoining compartments.

22.2.2.5.2 Horizontal exits shall be permitted to comprise 100 percent of the exits required, provided that an exit, other than a horizontal exit, located in another (not necessarily adjacent) fire compartment is accessible without returning through the compartment of fire origin.

22.2.2.6 Ramps. Ramps complying with 7.2.5 shall be permitted.

22.2.2.7 Exit Passageways. Exit passageways complying with 7.2.6 shall be permitted.

22.2.2.8 (Reserved.)

22.2.2.9 Fire Escape Ladders. Fire escape ladders complying with 7.2.9 shall be permitted.

22.2.2.10 Alternating Tread Devices. Alternating tread devices complying with 7.2.11 shall be permitted.

22.2.2.11 Areas of Refuge. Areas of refuge complying with 7.2.12 shall be permitted.

22.2.3 Capacity of Means of Egress.

22.2.3.1 The capacity of any required means of egress shall be in accordance with Section 7.3.

22.2.3.2 Aisles, corridors, and ramps required for egress shall be not less than 4 ft (1.2 m) in width.

22.2.3.3 For residents' sleeping room door widths, see 22.2.11.3.

22.2.4 Number of Exits. (See also Section 7.4.)

22.2.4.1 Not less than two separate exits shall meet the following criteria:

- (1) They shall be provided on every story.
- (2) They shall be accessible from every part of every story, fire compartment, or smoke compartment; however, exit access travel shall be permitted to be common for the distances permitted as common path of travel by 22.2.5.3.

22.2.4.2* Not less than one approved exit shall be accessible from each fire compartment and each required smoke compartment into which residents are potentially moved in a fire emergency, with the exits arranged so that egress is possible without returning through the zone of fire origin.

22.2.5 Arrangement of Means of Egress. (See also Section 7.5.)

22.2.5.1 Every sleeping room shall have a door leading directly to an exit access corridor.

Exception No. 1: If there is an exit door opening directly to the outside from the room at the ground level.

Exception No. 2: One adjacent room, such as a day room, group activity space, or other common space shall be permitted to intervene. Where sleeping rooms directly adjoin a day room or group activity space that is used for access to an exit, such sleeping rooms shall be permitted to open directly to the day room or space and shall be permitted to be separated in elevation by a one-half or full story height. (See 22.4.4.6.)

22.2.5.2 No exit or exit access shall contain a corridor, hallway, or aisle having a pocket or dead end exceeding 50 ft (15 m) for Use Condition II, Use Condition III, or Use Condition IV and 20 ft (6.1 m) for Use Condition V.

22.2.5.3 A common path of travel shall not exceed 100 ft (30 m).

22.2.5.4 A sally port shall be permitted in a means of egress where there are provisions for continuous and unobstructed travel through the sally port during an emergency egress condition.

22.2.6 Travel Distance to Exits. Travel distance shall comply with 22.2.6.1 through 22.2.6.3.

22.2.6.1 The travel distance between any room door required as an exit access and an exit shall not exceed 150 ft (45 m).

22.2.6.2 The travel distance between any point in a room and an exit shall not exceed 200 ft (60 m).

22.2.6.3 The travel distance between any point in a sleeping room to the door in that room shall not exceed 50 ft (15 m).

Exception: The maximum travel distance shall be permitted to be increased to 100 ft (30 m) in open dormitories where the enclosing walls of the dormitory space are of smoketight construction. Where travel distance to the exit access door from any point within the dormitory exceeds 50 ft (15 m), not less than two exit access doors remotely located from each other shall be provided.

22.2.7 Discharge from Exits.

22.2.7.1 Exits shall be permitted to discharge into a fenced or walled courtyard, provided that not more than two walls of the courtyard are the building walls from which egress is being made. Enclosed yards or courts shall be of sufficient size to accommodate all occupants at a distance of not less than 50 ft (15 m) from the building while providing a net area of 15 ft² (1.4 m²) per person.

22.2.7.2 All exits shall be permitted to discharge through the level of exit discharge. The requirements of 7.7.2 shall be waived, provided that not more than 50 percent of the exits discharge into a single fire compartment separated from other compartments by construction having not less than a 1-hour fire resistance rating.

22.2.8 Illumination of Means of Egress. Means of egress shall be illuminated in accordance with Section 7.8.

22.2.9 Emergency Lighting. Emergency lighting shall be provided in accordance with Section 7.9.

22.2.10 Marking of Means of Egress. Exit marking shall be provided in areas accessible to the public in accordance with Section 7.10.

Exception: Exit signs shall not be required in detention and correctional residential housing areas. (See definition in 3.3.145.)

22.2.11 Special Features.

22.2.11.1 Doors within means of egress shall be in accordance with Chapter 7.

Exception: As provided in 22.2.11.2 through 22.2.11.10.

22.2.11.2 Doors shall be permitted to be locked in accordance with the applicable use condition.

22.2.11.3* Doors to resident sleeping rooms shall be not less than 28 in. (71 cm) in clear width.

22.2.11.4 Doors in a means of egress shall be permitted to be of the horizontal sliding type, provided that the force necessary to slide the door to its fully open position does not exceed 50 lbf (222 N) where a force of 50 lbf (222 N) is simultaneously applied perpendicular to the door.

22.2.11.5 Doors from areas of refuge to the exterior shall be permitted to be locked with key locks in lieu of locking methods described in 22.2.11.6. The keys to unlock such doors shall be maintained and available at the facility at all times, and the locks shall be operable from the outside.

22.2.11.6* Any remote-control release used in a means of egress shall be provided with a reliable means of operation to release locks on all doors and shall be remotely located from the resident living areas. The remote location shall provide sight and sound supervision of the resident living areas.

Exception: Remote-control locking and unlocking of occupied rooms in Use Condition IV shall not be required, provided that not more than 10 locks need to be unlocked in order to relocate all occupants from one smoke compartment to an area of refuge as promptly as is required where remote-control unlocking is used. Unlocking of all necessary locks shall be accomplished with not more than two separate keys. (See 22.3.7.7 for requirements for smoke barrier doors.)

22.2.11.7 All remote-control release-operated doors shall be provided with a redundant means of operation as follows:

- (1) Power-operated sliding doors or power-operated locks shall be constructed so that, in the event of power failure, a manual mechanical means to release and open the doors is provided at each door, and either emergency power arranged in accordance with 7.9.2.2 is provided for the power operation or a remote-control manual mechanical release is provided.
- (2) Mechanically operated sliding doors or mechanically operated locks shall be provided with a manual mechanical means at each door to release and open the door.

22.2.11.8 The provisions of 7.2.1.5.2 for stairway re-entry shall not apply.

22.2.11.9 Doors unlocked by means of remote control under emergency conditions shall not automatically relock when closed unless specific action is taken at the remote-control location to enable doors to relock.

22.2.11.10 Emergency power shall be provided for all electrically power-operated sliding doors and power-operated locks. Power shall be arranged to automatically operate within 10 seconds upon failure of normal power and to maintain the necessary power source for not less than 1½ hours.

Exception: This provision shall not be applicable for facilities with 10 or fewer locks complying with the exception to 22.2.11.6.

SECTION 22.3 PROTECTION

22.3.1 Protection of Vertical Openings.

22.3.1.1 Any vertical opening shall be enclosed or protected in accordance with 8.2.5.

Exception No. 1: Unprotected vertical openings in accordance with 8.2.5.8 shall be permitted.

Exception No. 2: In residential housing area smoke compartments, unprotected vertical openings shall be permitted in accordance with the conditions of 8.2.5.5, provided that the height between the lowest and highest finished floor levels does not exceed 23 ft (7 m). The number of*

levels shall not be restricted. Residential housing areas subdivided in accordance with 22.3.8 shall be permitted to be considered as part of the communicating space. The separation shall not be required to have a fire resistance rating. (See Exception No. 2 to 8.2.5.5(4).)

22.3.2 Protection from Hazards.

22.3.2.1* Hazardous Areas. Any hazardous area shall be protected in accordance with Section 8.4. The areas described in Table 22.3.2.1 shall be protected as indicated.

Table 22.3.2.1 Hazardous Area Protection

Hazardous Area Description	Separation/Protection
Areas not incidental to resident housing	2 hours
Boiler and fuel-fired heater rooms	1 hour
Central or bulk laundries >100 ft ² (>9.3 m ²)	1 hour
Commercial cooking equipment	In accordance with 9.2.3
Commissaries	Smoke resistant
Employee locker rooms	Smoke resistant
Hobby/handicraft shops	Smoke resistant
Maintenance shops	Smoke resistant
Padded cells	1 hour
Soiled linen rooms	1 hour
Storage rooms >50 ft ² (>4.6 m ²) in area but ≤100 ft ² (≤9.3 m ²) in area storing combustible material	Smoke resistant
Storage rooms >100 ft ² (>9.3 m ²) storing combustible materials	1 hour
Trash collection rooms	1 hour

22.3.2.2 Hazardous areas determined by the authority having jurisdiction as not incidental to residents' housing shall be separated by 2-hour fire resistance-rated barriers in conjunction with automatic sprinkler protection.

22.3.2.3 Where cooking facilities are protected in accordance with 9.2.3, kitchens shall not be required to be provided with roomwide protection.

22.3.3 Interior Finish.

22.3.3.1 Interior finish shall be in accordance with Section 10.2.

22.3.3.2 Interior Wall and Ceiling Finish. Interior wall and ceiling finish complying with 10.2.3 shall be Class A or Class B in corridors, in exits, and in any space not separated from corridors and exits by partitions capable of retarding the passage of smoke; and Class A, Class B, or Class C in all other areas. The provisions of 10.2.8.1 shall not apply.

22.3.3.3 Interior Floor Finish. Interior floor finish complying with 10.2.7 shall be Class I or Class II in corridors and exits. The provisions of 10.2.8.2 shall not apply.

22.3.4 Detection, Alarm, and Communications Systems.

22.3.4.1 General.

22.3.4.1.1 Detention and correctional occupancies shall be provided with a fire alarm system in accordance with Section 9.6, except as modified by 22.3.4.1.2 through 22.3.4.4.

22.3.4.1.2 All fire alarm systems and detection systems required in 22.3.4 shall be provided with a secondary power supply, and the installation shall be in accordance with NFPA 72, *National Fire Alarm Code*.

22.3.4.2 Initiation. Initiation of the required fire alarm system shall be by manual means in accordance with 9.6.2, by means of any required detection devices or detection systems, and by means of waterflow alarm in the sprinkler system required by 22.3.5.2.

Exception No. 1: Manual fire alarm boxes shall be permitted to be locked, provided that staff is present within the area when it is occupied and staff has keys readily available to unlock the boxes.

Exception No. 2: Manual fire alarm boxes shall be permitted to be located in a staff location, provided that the staff location is attended when the building is occupied and that the staff attendant has direct supervision of the sleeping area.

22.3.4.3 Notification.

22.3.4.3.1 Occupant Notification. Occupant notification shall be accomplished automatically in accordance with 9.6.3. A positive alarm sequence shall be permitted in accordance with 9.6.3.4.

Exception: Any smoke detectors required by this chapter shall be permitted to be arranged to alarm at a constantly attended location only and shall not be required to accomplish general occupant notification.*

22.3.4.3.2 Emergency Forces Notification. Fire department notification shall be accomplished in accordance with 9.6.4. A positive alarm sequence shall be permitted in accordance with 9.6.3.4.

Exception No. 1: Any smoke detectors required by this chapter shall not be required to transmit an alarm to the fire department.

Exception No. 2: This requirement shall not apply where staff is provided at a constantly attended location that has the capability to promptly notify the fire department or has direct communication with a control room having direct access to the fire department. The fire plan, as required by 22.7.1.3, shall include procedures for logging of alarms and immediate notification of the fire department.

22.3.4.4* Detection. An approved automatic smoke detection system shall be in accordance with Section 9.6, as modified by 22.3.4.4.1 through 22.3.4.4.3, throughout all resident sleeping areas and adjacent day rooms, activity rooms, or contiguous common spaces.

22.3.4.4.1 Smoke detectors shall not be required in sleeping rooms with four or fewer occupants.

22.3.4.4.2 Other arrangements and positioning of smoke detectors shall be permitted to prevent damage or tampering, or for other purposes. Such arrangements shall be capable of detecting any fire, and the placement of detectors shall be such that the speed of detection is equivalent to that provided by the spacing and arrangements required by the installation standards referenced in Section 9.6. Detectors shall be permitted to be located in exhaust ducts from cells, behind grilles, or in other locations. The equivalent performance of the design, however, shall be acceptable to the authority having jurisdiction

in accordance with the equivalency concepts specified in Section 1.5.

22.3.4.4.3* Smoke detectors shall not be required in Use Condition II open dormitories where staff is present within the dormitory whenever the dormitory is occupied.

22.3.5 Extinguishment Requirements.

22.3.5.1 High-rise buildings shall comply with 22.4.3.

22.3.5.2 All buildings classified as Use Condition II, Use Condition III, Use Condition IV, or Use Condition V shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

22.3.5.3 The automatic sprinkler system required by 22.3.5.2 shall be as follows:

- (1) In accordance with Section 9.7
- (2) Electrically connected to the fire alarm system
- (3) Fully supervised

22.3.5.4 Portable fire extinguishers shall be provided in accordance with 9.7.4.1.

Exception No. 1: Access to portable fire extinguishers shall be permitted to be locked.*

Exception No. 2: Portable fire extinguishers shall be permitted to be located at staff locations only.

22.3.5.5 Standpipe and hose systems shall be provided in accordance with 9.7.4.2 as follows:

- (1) Class I standpipe systems shall be provided for any building over two stories in height.
- (2) Class III standpipe and hose systems shall be provided for all nonsprinklered buildings over two stories in height.

Exception No. 1: One-inch (2.5-cm) diameter formed hose on hose reels shall be permitted to provide Class II service.

Exception No. 2: Separate Class I and Class II systems shall be permitted in lieu of a Class III system.

22.3.6 Corridors. (See 22.3.8.)

22.3.7 Subdivision of Building Spaces.

22.3.7.1 Smoke barriers shall be provided to divide every story used for sleeping by residents, or any other story having an occupant load of 50 or more persons, into not less than two compartments.

Exception No. 1: Protection shall be permitted to be accomplished using horizontal exits. (See 7.2.4.)

Exception No. 2: The requirement for subdivision of building space shall be permitted to be fulfilled by one of the following:*

(a) Smoke compartments having exit to a public way where such exit serves only one area and has no openings to other areas

(b) A building separated from the resident housing area by a 2-hour fire resistance rating or 50 ft (15 m) of open space

(c) A secured, open area having a holding space located 50 ft (15 m) from the housing area that provides 15 ft² (1.4 m²) or more of refuge area for each person (resident, staff, visitors) potentially present at the time of a fire

Doors used to access the areas specified in (a), (b), and (c) of this exception shall meet the requirements for doors at smoke barriers for the applicable use condition.

22.3.7.2 Where smoke barriers are required by 22.3.7.1, they shall be provided as follows:

- (1) They shall limit the occupant load to not more than 200 residents in any smoke compartment.
- (2) They shall limit the travel distance to a door in a smoke barrier as follows:
 - a. The distance from any room door required as exit access shall not exceed 150 ft (45 m).
 - b. The distance from any point in a room shall not exceed 200 ft (60 m).

22.3.7.3* Any required smoke barrier shall be constructed in accordance with Section 8.3. Barriers shall be of substantial construction and shall have structural fire resistance.

22.3.7.4 Openings in smoke barriers shall be protected in accordance with Section 8.3.

*Exception No. 1:** There shall be no restriction on the total number of vision panels in any barrier.

Exception No. 2: Sliding doors in smoke barriers that are designed to normally be kept closed and are remotely operated from a continuously attended location shall not be required to be self-closing.

22.3.7.5 Not less than 6 net ft² (0.56 net m²) per occupant shall be provided on each side of the smoke barrier for the total number of occupants in adjoining compartments. This space shall be readily available wherever occupants are moved across the smoke barrier in a fire emergency.

22.3.7.6 Doors shall provide resistance to the passage of smoke. Swinging doors shall be self-latching, or the opening resistance of the door shall be not less than 5 lbf (22 N).

22.3.7.7 Doors in smoke barriers shall conform with the requirements for doors in means of egress as specified in Section 22.2 and shall have locking and release arrangements according to the applicable use condition. The provisions of the exception to 22.2.11.6 shall not be used for smoke barrier doors serving a smoke compartment containing more than 20 persons.

22.3.7.8 Vision panels shall be provided in smoke barriers at points where the barrier crosses an exit access corridor.

22.3.7.9 Smoke dampers shall be provided in accordance with 8.3.5.

Exception: Other arrangements and positioning of smoke detectors shall be permitted to prevent damage or tampering, or for other purposes. Such arrangements shall be capable of detecting any fire, and the placement of detectors shall be such that the speed of detection is equivalent to that provided by the spacing and arrangement required by NFPA 72, National Fire Alarm Code, as referenced in 8.3.5.3.

22.3.8* Special Protection Features — Subdivision of Resident Housing Spaces. Subdivision of facility spaces shall comply with Table 22.3.8.

Table 22.3.8 Subdivision of Resident Housing Spaces

Feature	Use Condition				
	II	III	IV	V	
Room to room separation	NR	NR	NR	SR	
Room face to corridor separation	NR	NR	NR	SR	
Room face to common space separation	NR	NR ≤50 ft (≤15 m) [†]	SR >50 ft (>15 m) [†]	NR ≤50 ft (≤15 m) [†]	SR >50 ft (>15 m) [†]
Common space to corridor separation	NR	NR	NR	SR	
Total openings in solid room face where room face is required to be smoke resistant or fire rated [‡]	120 in. ² (0.08 m ²)	120 in. ² (0.08 m ²)	120 in. ² (0.08 m ²)	120 in. ² (0.08 m ²), closable from inside, or 120 in. ² (0.08 m ²) with smoke control	

NR: No requirement.

SR: Smoke resistant.

Notes:

1. Doors in openings in partitions required to be smoke resistant (SR) in accordance with Table 22.3.8 shall be substantial doors of construction that resists the passage of smoke. Latches and door closers shall not be required on cell doors.

2. Under Use Condition II, Use Condition III, or Use Condition IV, a space subdivided by open construction (any combination of grating doors and grating walls or solid walls) shall be permitted to be considered one room if housing not more than 16 persons. The perimeter walls of such space shall be of smoke-resistant construction. Smoke detection shall be provided in such space. Under Use Condition IV, common walls between sleeping areas within the space shall be smoke resistant, and grating doors and fronts shall be permitted to be used. Under Use Condition II and Use Condition III, open dormitories shall be permitted to house more than 16 persons as permitted by other sections of this chapter.

3. Where barriers are required to be smoke resistant (SR), the provisions of 8.2.4 shall not apply.

[†]Travel distance through the common space to the exit access corridor.

[‡]“Total openings in solid room face” includes all openings (for example, undercuts, food passes, grilles), the total of which shall not exceed 120 in.² (0.08 m²). All openings shall be 36 in. (91 cm) or less above the floor.

SECTION 22.4 SPECIAL PROVISIONS

22.4.1 Windowless Structures. The provisions of Section 11.7 for windowless structures shall not apply.

22.4.2 Underground Buildings. See Section 11.7 for requirements for underground buildings.

22.4.3 High-Rise Buildings. High-rise buildings shall comply with 11.8.2.

22.4.4 Nonsprinklered Existing Building Renovations.

22.4.4.1 General. Modernizations or renovations of nonsprinklered existing buildings shall be permitted to meet the requirements of this chapter as modified by 22.4.4.2 through 22.4.4.13 in lieu of the sprinkler requirement of 22.3.5.2.

22.4.4.2 Minimum Construction Requirements (Nonsprinklered Buildings).

22.4.4.2.1 Detention and correctional occupancies in nonsprinklered buildings shall be limited to the types of building construction permitted by Table 22.4.4.2.1. (*See 8.2.1.*)

22.4.4.2.2 A residential housing area complying with 22.4.4.6 shall be considered as a one-story building for purposes of applying 22.4.4.2.

22.4.4.3* Horizontal Exit Duct Penetrations (Nonsprinklered Buildings). Ducts shall be permitted to penetrate horizontal exits in accordance with Exception No. 2 to 7.2.4.3.3 if protected by combination fire dampers/smoke leakage-rated dampers that meet the smoke damper actuation requirements of 8.3.5.

22.4.4.4 Common Path of Travel (Nonsprinklered Buildings). A common path of travel shall not exceed 50 ft (15 m).

22.4.4.5 Travel Distance to Exits (Nonsprinklered Buildings).

22.4.4.5.1 The travel distance between any room door required as an exit access and an exit shall not exceed 100 ft (30 m).

22.4.4.5.2 The travel distance between any point in a room and an exit shall not exceed 150 ft (45 m).

22.4.4.6 Protection of Vertical Openings (Nonsprinklered Buildings).

22.4.4.6.1 Multilevel residential housing areas without enclosure protection between levels shall be permitted, provided that the conditions of 22.4.4.6.2 through 22.4.4.6.4 are met.

22.4.4.6.2* The entire normally occupied area, including all communicating floor levels, shall be sufficiently open and unobstructed so that a fire or other dangerous condition in any part is obvious to the occupants or supervisory personnel in the area.

22.4.4.6.3 Egress capacity shall simultaneously accommodate all occupants of all communicating levels and areas, with all communicating levels in the same fire area considered as a single floor area for purposes of determining required egress capacity.

22.4.4.6.4* The height between the highest and lowest finished floor levels shall not exceed 13 ft (4 m). The number of levels shall not be restricted.

22.4.4.7 Hazardous Areas (Nonsprinklered Buildings). Any hazardous area shall be protected in accordance with Section 8.4. The areas described in the Table 22.4.4.7 shall be protected as indicated.

22.4.4.8 Interior Finish (Nonsprinklered Buildings).

22.4.4.8.1 Interior Wall and Ceiling Finish. Interior wall and ceiling finish complying with 10.2.3 shall be Class A in corridors, in exits, and in any space not separated from corridors and exits by partitions capable of retarding the passage of smoke; and Class A, Class B, or Class C in all other areas.

Table 22.4.4.2.1 Construction Type Limitations — Nonsprinklered Buildings

Type of Construction	1 Story with Basement	1 Story without Basement	2 Stories	3 Stories	>3 Stories and Not High-Rise	High-Rise
I(443)	X	X	X	X	X	NP
I(332)	X	X	X	X	X	NP
II(222)	X	X	X	X	X	NP
II(111)	X*	X	X*	NP	NP	NP
III(211)	X*	X*	X*	NP	NP	NP
IV(2HH)	X*	X*	X*	NP	NP	NP
V(111)	X*	X*	X*	NP	NP	NP
II(000)	NP	NP	NP	NP	NP	NP
III(200)	NP	NP	NP	NP	NP	NP
V(000)	NP	NP	NP	NP	NP	NP

X: Permitted types of construction.

NP: Not permitted.

*Permitted for other than Use Condition V.

Table 22.4.4.7 Hazardous Area Protection — Nonsprinklered Buildings

Hazardous Area Description	Separation/Protection
Areas not incidental to resident housing	2 hours
Boiler and fuel-fired heater rooms	2 hours or 1 hour and sprinklers
Central or bulk laundries >100 ft ² (>9.3 m ²)	2 hours or 1 hour and sprinklers
Commercial cooking equipment	In accordance with 9.2.3
Commissaries	1 hour or sprinklers
Employee locker rooms	1 hour or sprinklers
Hobby/handicraft shops	1 hour or sprinklers
Maintenance shops	1 hour or sprinklers
Padded cells	2 hours or 1 hour and sprinklers
Soiled linen rooms	2 hours or 1 hour and sprinklers
Storage rooms >50 ft ² (>4.6 m ²) in area but ≤100 ft ² (≤9.3 m ²) in area storing combustible material	1 hour or sprinklers
Storage rooms >100 ft ² (>9.3 m ²) storing combustible materials	2 hours or 1 hour and sprinklers
Trash collection rooms	2 hours or 1 hour and sprinklers

22.4.4.8.2 Interior Floor Finish. Interior floor finish complying with 10.2.7 shall be Class I in corridors and exits.

22.4.4.9 Detection, Alarm, and Communications Systems (Nonsprinklered Buildings).

22.4.4.9.1 Initiation. Initiation of the fire alarm system required by 22.3.4.1.1 shall be by manual means in accordance with 9.6.2 and by means of any required detection devices or detection systems.

Exception No. 1: Manual fire alarm boxes shall be permitted to be locked, provided that staff is present within the area when it is occupied and staff has keys readily available to unlock the boxes.

Exception No. 2: Manual fire alarm boxes shall be permitted to be located in a staff location, provided that the staff location is attended when the building is occupied and that the staff attendant has direct supervision of the sleeping area.

22.4.4.9.2 Detection. An approved automatic smoke detection system shall be in accordance with Section 9.6, as modified by 22.4.4.9.2.1 and 22.4.4.9.2.2, throughout all resident sleeping areas and adjacent day rooms, activity rooms, or contiguous common spaces.

22.4.4.9.2.1 Smoke detectors shall not be required in sleeping rooms with four or fewer occupants in Use Condition II or Use Condition III.

22.4.4.9.2.2 Other arrangements and positioning of smoke detectors shall be permitted to prevent damage or tampering, or for other purposes. Such arrangements shall be capable of detecting any fire, and the placement of detectors shall be such that the speed of detection is equivalent to that provided by the spacing and arrangements required by the installation standards referenced in Section 9.6. Detectors shall be permitted to be located in exhaust ducts from cells, behind grilles, or in other locations. The equivalent performance of the design, however, shall be acceptable to the authority having jurisdiction in accordance with the equivalency concepts specified in Section 1.5.

22.4.4.10 Subdivision of Building Spaces (Nonsprinklered Buildings). Where smoke barriers are required by 22.3.7.1, they shall be provided as follows:

- (1) They shall limit the occupant load to not more than 200 residents in any smoke compartment.
- (2) They shall limit the travel distance to a door in a smoke barrier as follows:
 - a. The distance from any room door required as exit access shall not exceed 100 ft (30 m).
 - b. The distance from any point in a room shall not exceed 150 ft (45 m).

22.4.4.11* Subdivision of Resident Housing Spaces (Nonsprinklered Buildings). Subdivision of facility spaces shall comply with Table 22.4.4.11.

22.4.4.12 Windowless Structures (Nonsprinklered Buildings).

22.4.4.12.1 Windowless structures used as detention and correctional occupancies shall comply with 22.4.4.12.2. The provisions of Section 11.7 for windowless structures shall not apply.

22.4.4.12.2 Means shall be provided to evacuate smoke from the smoke compartment of fire origin. Any of the following means shall be acceptable:

- (1) Operable windows on not less than two sides of the building, spaced not more than 30 ft (9.1 m) apart, that provide openings with dimensions of not less than 22 in. (56 cm) in width and 24 in. (61 cm) in height
- (2) *Manual or automatic smoke vents
- (3) Engineered smoke control system
- (4) Mechanical exhaust system providing not less than 6 air changes per hour
- (5) Other method acceptable to the authority having jurisdiction

22.4.4.13* Furnishings, Bedding, and Decorations (Nonsprinklered Buildings).

22.4.4.13.1 Newly introduced upholstered furniture within detention and correctional occupancies shall be tested in accordance with the provisions of 10.3.2(2) and 10.3.3.

22.4.4.13.2* Newly introduced mattresses within detention and correctional occupancies shall be tested in accordance with the provisions of 10.3.2(3) and 10.3.4.

Table 22.4.4.11 Subdivision of Resident Housing Spaces — Nonsprinklered Buildings

Feature	Use Condition			
	II	III	IV	V
Room to room separation	NR	NR	SR	FR ^(1/2)
Room face to corridor separation	SR	SR	SR	FR
Room face to common space separation	NR	NR ≤50 ft (≤15 m) [†]	SR >50 ft (>15 m) [†]	FR
Common space to corridor separation	FR	FR	FR	FR
Total openings in solid room face where room face is required to be smoke resistant or fire rated [‡]	120 in. ² (0.08 m ²)	120 in. ² (0.08 m ²)	120 in. ² (0.08 m ²)	120 in. ² (0.08 m ²), closable from inside, or 120 in. ² (0.08 m ²) with smoke control

NR: No requirement.

SR: Smoke resistant.

FR^(1/2): Fire rated — 1/2 hour.

FR: Fire rated — 1 hour.

Notes:

1. Doors in openings in partitions required to be fire rated (FR^(1/2), FR) in accordance with Table 22.4.4.11 in other than required enclosures of exits or hazardous areas shall be substantial doors of construction that resists fire for not less than 20 minutes. Vision panels with wired glass or glass with not less than 45-minute fire-rated glazing shall be permitted. Latches and door closers shall not be required on cell doors.

2. Doors in openings in partitions required to be smoke resistant (SR) in accordance with Table 22.4.4.11 shall be substantial doors of construction that resists the passage of smoke. Latches and door closers shall not be required on cell doors.

3. Under Use Condition II, Use Condition III, or Use Condition IV, a space subdivided by open construction (any combination of grating doors and grating walls or solid walls) shall be permitted to be considered one room if housing not more than 16 persons. The perimeter walls of such space shall be of smoke-resistant construction. Smoke detection shall be provided in such space. Under Use Condition IV, common walls between sleeping areas within the space shall be smoke resistant, and grating doors and fronts shall be permitted to be used. In Use Condition II and Use Condition III, open dormitories shall be permitted to house more than 16 persons as permitted by other sections of this chapter.

4. Where barriers are required to be smoke resistant (SR), the provisions of 8.2.4 shall not apply.

[†]Travel distance through the common space to the exit access corridor.

[‡]“Total openings in solid room face” includes all openings (for example, undercuts, food passes, grilles), the total of which shall not exceed 120 in.² (0.08 m²). All openings shall be 36 in. (91 cm) or less above the floor.

SECTION 22.5 BUILDING SERVICES

22.5.1 Utilities.

22.5.1.1 Utilities shall comply with the provisions of Section 9.1.

22.5.1.2 Alarms, emergency communication systems, and the illumination of generator set locations shall be provided with emergency power in accordance with NFPA 70, *National Electrical Code*.

22.5.2 Heating, Ventilating, and Air Conditioning.

22.5.2.1 Heating, ventilating, and air conditioning equipment shall comply with the provisions of Section 9.2 and shall be installed in accordance with the manufacturer’s specifications.

Exception: As modified in 22.5.2.2.

22.5.2.2 Portable space-heating devices shall be prohibited. Any heating device other than a central heating plant shall be designed and installed so that combustible material shall not be ignited by the device or its appurtenances. If fuel-fired, such heating devices shall be chimney connected or vent connected,

shall take air for combustion directly from outside, and shall be designed and installed to provide for complete separation of the combustion system from the atmosphere of the occupied area. The heating system shall have safety devices to immediately stop the flow of fuel and shut down the equipment in case of either excessive temperatures or ignition failure.

Exception: Approved, suspended unit heaters shall be permitted in locations other than means of egress and sleeping areas, provided that such heaters are located high enough to be out of the reach of persons using the area and are vent connected and equipped with the safety devices required by 22.5.2.2.

22.5.2.3 Combustion and ventilation air for boiler, incinerator, or heater rooms shall be taken directly from and discharged directly to the outside.

22.5.3 Elevators, Escalators, and Conveyors. Elevators, escalators, and conveyors shall comply with the provisions of Section 9.4.

22.5.4 Rubbish Chutes, Incinerators, and Laundry Chutes.

22.5.4.1 Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 9.5.

22.5.4.2 Any rubbish chute or linen chute, including pneumatic rubbish and linen systems, shall be provided with automatic extinguishing protection in accordance with Section 9.7.

22.5.4.3 Any trash chute shall discharge into a trash collection room used for no other purpose and protected in accordance with Section 8.4.

22.5.4.4 Any incinerator shall not be directly flue-fed, nor shall any floor chute directly connect with the combustion chamber.

SECTION 22.6 RESERVED

SECTION 22.7 OPERATING FEATURES

22.7.1 Attendants, Evacuation Plan, Fire Drills.

22.7.1.1 Detention and correctional facilities, or those portions of facilities having such occupancy, shall be provided with 24-hour staffing. Staff shall be within three floors or a 300-ft (91-m) horizontal distance of the access door of each resident housing area.

In addition, for Use Condition III, Use Condition IV, and Use Condition V, the arrangement shall be such that the staff involved starts the release of locks necessary for emergency evacuation or rescue and initiates other necessary emergency actions within 2 minutes of alarm.

Exception: For areas in which all locks are unlocked remotely in compliance with 22.2.11.6, staff shall not be required to be within three floors or 300 ft (104 m) of the access door. The exception to 22.2.11.6 shall not be used in conjunction with this exception.

22.7.1.2* Provisions shall be made so that residents in Use Condition III, Use Condition IV, and Use Condition V shall be able to notify staff of an emergency.

22.7.1.3* The administration of every detention or correctional facility shall have, in effect and available to all supervisory personnel, written copies of a plan for the protection of all persons in the event of fire, for their evacuation to areas of refuge, and for evacuation from the building when necessary. All employees shall be instructed and drilled with respect to

their duties under the plan. The plan shall be coordinated with and reviewed by the fire department legally committed to serve the facility.

22.7.1.4 Employees of detention and correctional occupancies shall be instructed in the proper use of portable fire extinguishers and other manual fire suppression equipment. Such training shall be provided to new staff promptly upon commencement of duty. Refresher training shall be provided to existing staff at not less than annual intervals.

22.7.2 Books, clothing, and other combustible personal property allowed in sleeping rooms shall be stored in closable metal lockers or a fire-resistant container.

22.7.3 The number of heat-producing appliances, such as toasters and hot plates, and the overall use of electrical power within a sleeping room shall be controlled by facility administration.

22.7.4* Furnishings, Bedding, and Decorations.

22.7.4.1 Draperies and curtains, including privacy curtains, in detention and correctional occupancies shall be in accordance with the provisions of 10.3.1.

22.7.4.2 (Reserved.)

22.7.4.3 (Reserved.)

22.7.4.4 Combustible decorations shall be prohibited in any detention or correctional occupancy unless flame-retardant.

22.7.4.5 Wastebaskets and other waste containers shall be of noncombustible or other approved materials. Waste containers with a capacity exceeding 20 gal (76 L) shall be provided with a noncombustible lid or lid of other approved material.

22.7.5 Keys. All keys necessary for unlocking doors installed in a means of egress shall be individually identified by both touch and sight.

22.7.6 Portable Space-Heating Devices. Portable space-heating devices shall be prohibited in all detention and correctional occupancies.

Chapter 23 EXISTING DETENTION AND CORRECTIONAL OCCUPANCIES

SECTION 23.1 GENERAL REQUIREMENTS

23.1.1 Application.

23.1.1.1 The requirements of this chapter apply to existing buildings or portions thereof currently occupied as detention or correctional occupancies. (See also 22.1.1.1.)

23.1.1.2 This chapter establishes life safety requirements for all existing detention and correctional facilities.

Exception No. 1: Use Condition I facilities protected as residential occupancies in accordance with 23.1.4.3.

Exception No. 2: Facilities determined to have equivalent safety provided in accordance with Section 1.5.*

23.1.1.3 Detention and correctional occupancies shall include those used for purposes such as correctional institutions, detention facilities, community residential centers, training schools, work camps, and substance abuse centers where occupants are confined or housed under some degree of restraint or security.

23.1.1.4 Detention and correctional occupancies provide sleeping facilities for four or more residents and are occupied by persons who are generally prevented from taking self-preservation action because of security measures not under the occupants' control.

23.1.1.5 Total Concept. All detention and correctional facilities shall be designed, constructed, maintained, and operated to minimize the possibility of a fire emergency. Because the safety of all occupants in detention and correctional facilities cannot be adequately ensured solely by dependence on evacuation of the building, their protection from fire shall be provided by appropriate arrangement of facilities; adequate, trained staff; and development of operating, security, and maintenance procedures composed of the following:

- (1) Design, construction, and compartmentation
- (2) Provision for detection, alarm, and extinguishment
- (3) Fire prevention and planning, training, and drilling programs for the isolation of fire and the transfer of occupants to areas of refuge, for evacuation of the building, or for protection of the occupants in place
- (4) Provision of security to the degree necessary for the safety of the public and the occupants of the facility

23.1.1.6 Additions. Additions shall be separated from any existing structure not conforming with the provisions of Chapter 23 by a fire barrier having not less than a 2-hour fire resistance rating constructed to the requirements of the addition. Doors in these partitions shall normally be kept closed.

Exception: Doors shall be permitted to be held open if they meet the requirements of the exception to 7.2.1.8.

23.1.1.7 Modernizations or Renovations. Modernizations and renovations shall be in accordance with 4.6.7.

Exception: In nonsprinklered existing buildings, modernizations or renovations shall be permitted to comply with the nonsprinklered options contained in 22.4.4 in lieu of the sprinkler requirement of 22.3.5.2.

23.1.2* Mixed Occupancies. (See also 6.1.14.)

23.1.2.1* Egress provisions for areas of detention and correctional facilities that correspond to other occupancies shall

meet the corresponding requirements of this *Code* for such occupancies. Where security operations necessitate the locking of required means of egress, staff shall be provided for the supervised release of occupants during all times of use.

23.1.2.2 Sections of detention and correctional facilities shall be permitted to be classified as other occupancies, provided that they meet all of the following conditions:

- (1) They are not intended to serve residents for sleeping purposes.
- (2) They are separated from areas of detention or correctional occupancies by construction having not less than a 2-hour fire resistance rating.

23.1.2.3 Detention and correctional occupancies in buildings housing other occupancies shall be completely separated from the other occupancies by construction having not less than a 2-hour fire resistance rating, as provided for additions in 23.1.1.6.

23.1.2.4 All means of egress from detention and correctional occupancies that traverse other use areas shall, as a minimum, conform to the requirements of this *Code* for detention and correctional occupancies.

Exception: Egress through a horizontal exit into other contiguous occupancies that do not conform to detention and correctional occupancy egress provisions, but that do comply with requirements set forth in the appropriate occupancy chapter of this Code, shall be permitted, provided that the occupancy does not contain high hazard contents. The horizontal exit shall comply with the requirements of 23.2.2.5.

23.1.2.5 Any area with a hazard of contents classified higher than that of the detention or correctional occupancy and located in the same building shall be protected as required in 23.3.2.

23.1.2.6 Nondetention- or noncorrectional-related occupancies classified as containing high hazard contents shall not be permitted in buildings housing detention or correctional occupancies.

23.1.3 Special Definitions.

Detention and Correctional Residential Housing Area. See 3.3.45.

Sally Port (Security Vestibule). See 3.3.170.

23.1.4 Classification of Occupancy.

23.1.4.1* For application of the life safety requirements that follow, the resident user category shall be divided into the following five groups.

(a) *Use Condition I — Free Egress.* Free movement is allowed from sleeping areas and other spaces where access or occupancy is permitted to the exterior via means of egress meeting the requirements of this *Code*.

(b) *Use Condition II — Zoned Egress.* Free movement is allowed from sleeping areas and any other occupied smoke compartment to one or more other smoke compartments.

(c) *Use Condition III — Zoned Impeded Egress.* Free movement is allowed within individual smoke compartments, such as within a residential unit comprised of individual sleeping rooms and a group activity space, with egress impeded by remote-controlled release of means of egress from such a smoke compartment to another smoke compartment.

(d) *Use Condition IV — Impeded Egress.* Free movement is restricted from an occupied space. Remote-controlled release

is provided to allow movement from all sleeping rooms, activity spaces, and other occupied areas within the smoke compartment to another smoke compartment.

(e) *Use Condition V — Contained.* Free movement is restricted from an occupied space. Staff-controlled manual release at each door is provided to allow movement from all sleeping rooms, activity spaces, and other occupied areas within the smoke compartment to another smoke compartment.

23.1.4.2* To be classified as Use Condition III or Use Condition IV, the arrangement, accessibility, and security of the release mechanism(s) used for emergency egress shall be such that the minimum available staff, at any time, can promptly release the locks.

23.1.4.3 Areas housing occupancies corresponding to Use Condition I shall conform to the requirements of residential occupancies under this *Code*.

Exception. Use Condition I facilities shall be permitted to conform to the requirements of this chapter for Use Condition II facilities, provided that the staffing requirements of Section 23.7 are met.*

23.1.5 Classification of Hazard of Contents. The classification of hazard of contents shall be as defined in Section 6.2.

23.1.6 Minimum Construction Requirements.

23.1.6.1 For the purposes of 23.1.6, the number of stories shall be counted starting with the primary level of exit discharge. For the purposes of 23.1.6, the primary level of exit discharge of a building shall be that floor that is level with or above finished grade on the exterior wall line for 50 percent or more of its perimeter. Building levels below the primary level shall not be counted as a story in determining the height of the building.

23.1.6.2 A residential housing area complying with 23.3.1.2 shall be considered as a one-story building for purposes of applying 23.1.6.3.

23.1.6.3 Detention and correctional occupancies shall be limited to the types of building construction permitted by Table 23.1.6.3. (See 8.2.1.)

Table 23.1.6.3 Construction Type Limitations

Type of Construction	1 Story with Basement	1 Story without Basement	2 Stories	3 Stories	>3 Stories and Not High-Rise	High-Rise
I(443)	X	X	X	X	X	X ¹
I(332)	X	X	X	X	X	X ¹
II(222)	X	X	X	X	X	X ¹
II(111)	X ²	X	X ²	X ¹	X ¹	X ¹
III(211)	X ²	X	X ²	X ¹	X ¹	X ¹
IV(2HH)	X ²	X	X ²	X ¹	X ¹	X ¹
V(111)	X ²	X	X ²	X ¹	X ¹	X ¹
II(000)	X ²	X ²	X ¹	X ¹	X ¹	X ¹
III(200)	X ²	X ²	X ¹	X ¹	X ¹	X ¹
V(000)	X ²	X ²	X ¹	X ¹	X ¹	X ¹

X: Permitted types of construction.

¹Permitted if the entire building is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

²Where Use Condition V is used, permitted if the entire building is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

Exception No. 1: Any building of Type I, Type II(222), or Type II(111) construction shall be permitted to include roofing systems involving combustible or steel supports, decking, or roofing, provided that the following criteria are met:

(a) *The roof covering meets not less than Class C requirements in accordance with NFPA 256, Standard Methods of Fire Tests of Roof Coverings.*

(b) *The roof is separated from all occupied portions of the building by a noncombustible floor assembly that includes not less than 2 1/2 in. (6.4 cm) of concrete or gypsum fill. To qualify for this exception, the attic or other space so developed shall be either unoccupied or protected throughout by an approved automatic sprinkler system.*

Exception No. 2: In determining building construction type, exposed steel roof members located 16 ft (4.9 m) or more above the floor of the highest cell shall be disregarded.

23.1.7 Occupant Load. The occupant load, in number of persons for whom means of egress and other provisions are required, shall be determined on the basis of the occupant load factors of Table 7.3.1.2 that are characteristic of the use of the space or shall be determined as the maximum probable population of the space under consideration, whichever is greater.

SECTION 23.2 MEANS OF EGRESS REQUIREMENTS

23.2.1 General. Means of egress shall comply with Chapter 7. *Exception: As otherwise provided or modified in Section 23.2.*

23.2.2 Means of Egress Components.

23.2.2.1 Components of means of egress shall be limited to the types described in 23.2.2.2 through 23.2.2.11.

23.2.2.2 Doors. Doors complying with 7.2.1 shall be permitted.

Exception: As provided in 23.2.11.

23.2.2.3 Stairs.

23.2.2.3.1 Stairs complying with 7.2.2 shall be permitted.

Exception: Noncombustible grated stair treads and landing floors shall be permitted.

23.2.2.3.2 Spiral stairs complying with 7.2.2.2.3 shall be permitted for access to and between staff locations.

23.2.2.4 Smokeproof Enclosures. Smokeproof enclosures complying with 7.2.3 shall be permitted.

23.2.2.5 Horizontal Exits. Horizontal exits complying with 7.2.4 and the modifications of 23.2.2.5.1 through 23.2.2.5.4 shall be permitted.

23.2.2.5.1 Not less than 6 ft² (0.56 m²) of accessible space per occupant shall be provided on each side of the horizontal exit for the total number of people in adjoining compartments.

23.2.2.5.2* Horizontal exits shall be permitted to comprise 100 percent of the exits required, provided that an exit, other than a horizontal exit, located in another (not necessarily adjacent) fire compartment is accessible without returning through the compartment of fire origin.

23.2.2.5.3* Ducts shall be permitted to penetrate horizontal exits in accordance with Exception No. 2 to 7.2.4.3.3 if protected by combination fire dampers/smoke leakage-rated dampers that meet the smoke damper actuation requirements of 8.3.5.

23.2.2.5.4 A door in a horizontal exit shall not be required to swing with egress travel as specified in 7.2.4.3.6.

23.2.2.6 Ramps. Ramps complying with 7.2.5 shall be permitted.

23.2.2.7 Exit Passageways. Exit passageways complying with 7.2.6 shall be permitted.

23.2.2.8 Fire Escape Stairs. Fire escape stairs complying with 7.2.8 shall be permitted.

23.2.2.9 Fire Escape Ladders. Fire escape ladders complying with 7.2.9 shall be permitted.

23.2.2.10 Alternating Tread Devices. Alternating tread devices complying with 7.2.11 shall be permitted.

23.2.2.11 Areas of Refuge. Areas of refuge complying with 7.2.12 shall be permitted.

23.2.3 Capacity of Means of Egress.

23.2.3.1 The capacity of any required means of egress shall be in accordance with Section 7.3.

23.2.3.2 Aisles, corridors, and ramps required for egress shall be not less than 3 ft (0.9 m) in width.

23.2.3.3 For residents' sleeping room door widths, see 23.2.11.3.

23.2.4 Number of Exits. (See also Section 7.4.)

23.2.4.1* Not less than two separate exits shall meet the following criteria:

- (1) They shall be provided on every story.
- (2) They shall be accessible from every part of every story, fire compartment, or smoke compartment; however, exit access travel shall be permitted to be common for the distances permitted as common path of travel by 23.2.5.3.

23.2.4.2* Not less than one approved exit shall be accessible from each fire compartment and each required smoke compartment into which residents are potentially moved in a fire emergency, with the exits arranged so that egress is possible without returning through the zone of fire origin.

23.2.5 Arrangement of Means of Egress. (See also Section 7.5.)

23.2.5.1 Every sleeping room shall have a door leading directly to an exit access corridor.

Exception No. 1: If there is an exit door opening directly to the outside from the room at the ground level.

Exception No. 2: One adjacent room, such as a day room, group activity space, or other common space shall be permitted to intervene. Where sleeping rooms directly adjoin a day room or group activity space that is used for access to an exit, such sleeping rooms shall be permitted to open directly to the day room or space and shall be permitted to be separated in elevation by a one-half or full story height. (See 23.3.1.2.)

23.2.5.2* Existing dead-end corridors are undesirable and shall be altered wherever possible so that exits are accessible in not less than two different directions from all points in aisles, passageways, and corridors.

23.2.5.3 A common path of travel shall not exceed 50 ft (15 m).

Exception No. 1: A common path of travel shall be permitted for the first 100 ft (30 m) in smoke compartments protected throughout by an approved automatic sprinkler system in accordance with 23.3.5.3.

Exception No. 2: Multilevel residential housing units in which each floor level, considered separately, has not less than one-half of its individual required egress capacity accessible by exit access leading directly out of that level without traversing another communicating floor level.

Exception No. 3: Existing common paths of travel that exceed 50 ft (15 m) shall be permitted to continue to be used subject to the approval of the authority having jurisdiction and the travel distance requirements of 23.2.6.

23.2.5.4 A sally port shall be permitted in a means of egress where there are provisions for continuous and unobstructed travel through the sally port during an emergency egress condition.

23.2.6 Travel Distance to Exits. Travel distance shall comply with 23.2.6.1 through 23.2.6.3.

23.2.6.1 The travel distance between any room door required as an exit access and an exit or smoke barrier shall not exceed 100 ft (30 m).

Exception: The maximum travel distance shall be permitted to be increased by 50 ft (15 m) in buildings protected throughout by an approved automatic sprinkler system or smoke control system.

23.2.6.2 The travel distance between any point in a room and an exit or smoke barrier shall not exceed 150 ft (45 m).

Exception: The maximum travel distance shall be permitted to be increased by 50 ft (15 m) in buildings protected throughout by an approved automatic sprinkler system or smoke control system.

23.2.6.3 The travel distance between any point in a sleeping room to the door of that room shall not exceed 50 ft (15 m).

Exception: The maximum travel distance shall be permitted to be increased to 100 ft (30 m) in open dormitories where the enclosing walls of the dormitory space are of smoketight construction. Where travel distance to the exit access door from any point within the dormitory exceeds 50 ft (15 m), not less than two exit access doors remotely located from each other shall be provided.

23.2.7 Discharge from Exits.

23.2.7.1 Exits shall be permitted to discharge into a fenced or walled courtyard, provided that not more than two walls of the courtyard are the building walls from which egress is being made. Enclosed yards or courts shall be of sufficient size to

accommodate all occupants at a distance of not less than 50 ft (15 m) from the building while providing a net area of 15 ft² (1.4 m²) per person.

23.2.7.2 All exits shall be permitted to discharge through the level of exit discharge. The requirements of 7.7.2 shall be waived, provided that not more than 50 percent of the exits discharge into a single fire compartment separated from other compartments by construction having not less than a 1-hour fire resistance rating.

Exception: Where all exits discharge through areas on the level of discharge, a smoke barrier shall be provided to divide that level into not less than two compartments, with not less than one exit discharging into each compartment, and each smoke compartment shall have an exit discharge to the building exterior. The level of discharge shall be provided with automatic sprinkler protection. Any other portion of the level of discharge with access to the discharge area shall be provided with automatic sprinkler protection or shall be separated from the discharge area in accordance with the requirements for the enclosure of exits. (See 7.1.3.2.1.)

23.2.8 Illumination of Means of Egress. Means of egress shall be illuminated in accordance with Section 7.8.

23.2.9 Emergency Lighting. Emergency lighting shall be provided in accordance with Section 7.9.

Exception: Emergency lighting of not less than a 1-hour duration shall be permitted to be provided.

23.2.10 Marking of Means of Egress. Exit marking shall be provided in areas accessible to the public in accordance with Section 7.10.

Exception: Exit signs shall not be required in detention and correctional residential housing areas. (See definition of 3.3.145.)

23.2.11 Special Features.

23.2.11.1 Doors within means of egress shall be in accordance with Chapter 7.

Exception: As provided in 23.2.11.2 through 23.2.11.8.

23.2.11.2 Doors shall be permitted to be locked in accordance with the applicable use condition.

23.2.11.3* Doors to resident sleeping rooms shall be not less than 28 in. (71 cm) in clear width.

Exception: Existing doors to resident sleeping rooms housing four or fewer residents shall be permitted to be not less than 19 in. (48.3 cm) in clear width.

23.2.11.4 Doors in a means of egress shall be permitted to be of the horizontal sliding type, provided that the force necessary to slide the door to its fully open position does not exceed 50 lbf (222 N) where a force of 50 lbf (222 N) is simultaneously applied perpendicular to the door.

23.2.11.5 Doors from areas of refuge to the exterior shall be permitted to be locked with key locks in lieu of locking methods described in 23.2.11.6. The keys to unlock such doors shall be maintained and available at the facility at all times, and the locks shall be operable from the outside.

23.2.11.6* Any remote-control release used in a means of egress shall be provided with a reliable means of operation to release locks on all doors and shall be remotely located from the resident living area. The remote location shall provide sight and sound supervision of the resident living areas.

Exception: Remote-control locking and unlocking of occupied rooms in Use Condition IV shall not be required, provided that not more than

10 locks need to be unlocked in order to relocate all occupants from one smoke compartment to an area of refuge as promptly as is required where remote-control unlocking is used. Unlocking of all necessary locks shall be accomplished with not more than two separate keys. (See 23.3.7.7 for requirements for smoke barrier doors.)

23.2.11.7 All remote-control release-operated doors shall be provided with a redundant means of operation as follows:

- (1) Power-operated sliding doors or power-operated locks shall be constructed so that, in the event of power failure, a manual mechanical means to release and open the doors is provided at each door, and either emergency power arranged in accordance with 7.9.2.2 is provided for the power operation or a remote-control manual mechanical release is provided.

Exception: The combination of emergency power-operated release of selected individual doors and remote-control manual mechanical ganged release shall be permitted without mechanical release means at each door.

- (2) Mechanically operated sliding doors or mechanically operated locks shall be provided with a manual mechanical means at each door to release and open the door.

23.2.11.8 The provisions of 7.2.1.5.2 for stairway re-entry shall not apply.

SECTION 23.3 PROTECTION

23.3.1 Protection of Vertical Openings.

23.3.1.1 Any vertical opening shall be enclosed or protected in accordance with 8.2.5.

Exception No. 1: Unprotected vertical openings in accordance with 8.2.5.8 shall be permitted.

Exception No. 2: In residential housing area smoke compartments protected throughout by an approved automatic sprinkler system, unprotected vertical openings shall be permitted in accordance with the conditions of 8.2.5.5, provided that the height between the lowest and highest finished floor levels does not exceed 23 ft (7 m). The number of levels shall not be restricted. Residential housing areas subdivided in accordance with 23.3.8 shall be permitted to be considered as part of the communicating space. The separation shall not be required to have a fire resistance rating. (See Exception No. 2 to 8.2.5.5(4).)

Exception No. 3: Multilevel residential housing areas in accordance with 23.3.1.2.

Exception No. 4: Where full enclosure is impractical, the required enclosure shall be permitted to be limited to that necessary to prevent a fire originating in any story from spreading to any other story.

Exception No. 5: The fire resistance rating of enclosures in detention and correctional occupancies protected throughout by an approved automatic sprinkler system shall be not less than 1 hour.

23.3.1.2 Multilevel residential housing areas without enclosure protection between levels shall be permitted, provided that the conditions of 23.3.1.2.1 through 23.3.1.2.3 are met.

23.3.1.2.1* The entire normally occupied area, including all communicating floor levels, shall be sufficiently open and unobstructed so that a fire or other dangerous condition in any part is obvious to the occupants or supervisory personnel in the area.

23.3.1.2.2 Egress capacity shall simultaneously accommodate all occupants of all communicating levels and areas, with all communicating levels in the same fire area considered as a sin-

gle floor area for purposes of determining required egress capacity.

23.3.1.2.3* The height between the highest and lowest finished floor levels shall not exceed 13 ft (4 m). The number of levels shall not be restricted.

23.3.1.3* A multitiered, open cell block shall be considered as a single-story building, where one of the following criteria are met:

- (1) A smoke control system is provided (*see recommended design criteria in A.23.3.1.3*) to maintain the level of smoke from potential cell fires at not less than 5 ft (152 cm) above the floor level of any occupied tier involving space that is classified as follows:
 - a. Use Condition IV or Use Condition V
 - b. Use Condition III, unless all persons housed in such space can pass through a free access smoke barrier or freely pass below the calculated smoke level with not more than 50 ft (15 m) of travel from their cells
- (2) The entire building, including cells, is provided with complete automatic sprinkler protection in accordance with 23.3.5.

23.3.2 Protection from Hazards.

23.3.2.1* Hazardous Areas. Any hazardous area shall be protected in accordance with Section 8.4. The areas described in Table 23.3.2.1 shall be protected as indicated.

Table 23.3.2.1 Hazardous Area Protection

Hazardous Area Description	Separation/Protection
Areas not incidental to resident housing	2 hours
Boiler and fuel-fired heater rooms	1 hour or sprinklers
Central or bulk laundries >100 ft ² (>9.3 m ²)	1 hour or sprinklers
Commercial cooking equipment	In accordance with 9.2.3
Commissaries	1 hour or sprinklers
Employee locker rooms	1 hour or sprinklers
Hobby/handicraft shops	1 hour or sprinklers
Maintenance shops	1 hour or sprinklers
Padded cells	1 hour and sprinklers
Soiled linen rooms	1 hour or sprinklers
Storage rooms >50 ft ² (>4.6 m ²) in area storing combustible material	1 hour or sprinklers
Trash collection rooms	1 hour or sprinklers

23.3.2.2 Hazardous areas determined by the authority having jurisdiction as not incidental to residents' housing shall be separated by 2-hour fire resistance-rated barriers in conjunction with automatic sprinkler protection.

23.3.2.3 Where cooking facilities are protected in accordance with 9.2.3, kitchens shall not be required to be provided with roomwide protection.

23.3.3 Interior Finish.

23.3.3.1 Interior finish shall be in accordance with Section 10.2.

23.3.3.2 Interior Wall and Ceiling Finish. Interior wall and ceiling finish complying with 10.2.3 shall be Class A or Class B in corridors, in exits, and in any space not separated from corridors and exits by partitions capable of retarding the passage of smoke; and Class A, Class B, or Class C in all other areas.

23.3.3.3 Interior Floor Finish. Interior floor finish complying with 10.2.7 shall be Class I or Class II in corridors and exits.

Exception: Existing floor finish material of Class A or Class B in non-sprinklered smoke compartments and Class A, Class B, or Class C in sprinklered smoke compartments shall be permitted to be continued to be used, provided that it has been evaluated based on tests performed in accordance with 10.2.7.

23.3.4 Detection, Alarm, and Communications Systems.

23.3.4.1 General.

23.3.4.1.1 Detention and correctional occupancies shall be provided with a fire alarm system in accordance with Section 9.6, except as modified by 23.3.4.1.2 through 23.3.4.4.

Exception: Existing systems lacking the monitoring of wiring required by 9.6.1.6 shall be permitted to be continued in use in buildings protected by a complete automatic extinguishing system.

23.3.4.1.2 All fire alarm systems and detection systems required in 23.3.4 shall be provided with a secondary power supply, and the installation shall be in accordance with NFPA 72, *National Fire Alarm Code*.

23.3.4.2 Initiation. Initiation of the required fire alarm system shall be by manual means in accordance with 9.6.2 and by means of any required detection devices or detection systems.

Exception No. 1: Manual fire alarm boxes shall be permitted to be locked, provided that staff is present within the area when it is occupied and staff has keys readily available to unlock the boxes.

Exception No. 2: Manual fire alarm boxes shall be permitted to be located in a staff location, provided that the staff location is attended when the building is occupied and that the staff attendant has direct supervision of the sleeping area.

23.3.4.3 Notification.

23.3.4.3.1 Occupant Notification. Occupant notification shall be accomplished automatically in accordance with 9.6.3. A positive alarm sequence shall be permitted in accordance with 9.6.3.4.

Exception: Any smoke detectors required by this chapter shall be permitted to be arranged to alarm at a constantly attended location only and shall not be required to accomplish general occupant notification.*

23.3.4.3.2 Emergency Forces Notification. Fire department notification shall be accomplished in accordance with 9.6.4. A positive alarm sequence shall be permitted in accordance with 9.6.3.4.

Exception No. 1: Any smoke detectors required by this chapter shall not be required to transmit an alarm to the fire department.

Exception No. 2: This requirement shall not apply where staff is provided at a constantly attended location that has the capability to promptly notify the fire department or has direct communication with a control room having direct access to the fire department. The fire plan, as required by 23.7.1.3, shall include procedures for logging of alarms and immediate notification of the fire department.

23.3.4.4 Detection. An approved automatic smoke detection system shall be in accordance with Section 9.6, as modified by 23.3.4.4.1 through 23.3.4.4.4, throughout all resident housing areas.

23.3.4.4.1 Smoke detectors shall not be required in sleeping rooms with four or fewer occupants in Use Condition II or Use Condition III.

23.3.4.4.2 Other arrangements and positioning of smoke detectors shall be permitted to prevent damage or tampering, or for other purposes. Such arrangements shall be capable of detecting any fire, and the placement of detectors shall be such that the speed of detection is equivalent to that provided by the spacing and arrangements required by the installation standards referenced in Section 9.6. Detectors shall be permitted to be located in exhaust ducts from cells, behind grilles, or in other locations. The equivalent performance of the design, however, shall be acceptable to the authority having jurisdiction in accordance with the equivalency concepts specified in Section 1.5.

23.3.4.4.3* Smoke detectors shall not be required in Use Condition II open dormitories where staff is present within the dormitory whenever the dormitory is occupied and the building is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

23.3.4.4.4 In smoke compartments protected throughout by an approved automatic sprinkler system in accordance with 23.3.5.3, smoke detectors shall not be required, except in corridors, common spaces, and sleeping rooms with more than four occupants.

23.3.5 Extinguishment Requirements.

23.3.5.1 High-rise buildings shall comply with 23.4.3.

23.3.5.2* Where required by 23.1.6, facilities shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

23.3.5.3 Where this *Code* permits exceptions for fully sprinklered detention and correctional occupancies or sprinklered smoke compartments, the sprinkler system shall be as follows:

- (1) In accordance with Section 9.7
- (2) Electrically connected to the fire alarm system
- (3) Fully supervised

23.3.5.4 Portable fire extinguishers shall be provided in accordance with 9.7.4.1.

*Exception No. 1:** Access to portable fire extinguishers shall be permitted to be locked.

*Exception No. 2:** Portable fire extinguishers shall be permitted to be located at staff locations only.

23.3.5.5 Standpipe and hose systems shall be provided in accordance with 9.7.4.2 as follows:

- (1) Class I standpipe systems shall be provided for any building over two stories in height.
- (2) Class III standpipe and hose systems shall be provided for all nonsprinklered buildings over two stories in height.

*Exception No. 1:** One-inch (2.5-cm) diameter formed hose on hose reels shall be permitted to provide Class II service.

*Exception No. 2:** Separate Class I and Class II systems shall be permitted in lieu of a Class III system.

23.3.6 Corridors. (See 23.3.8.)

23.3.7 Subdivision of Building Spaces.

23.3.7.1* Smoke barriers shall be provided to divide every story used for sleeping by 10 or more residents, or any other story having an occupant load of 50 or more persons, into not less than two compartments.

*Exception No. 1:** Protection shall be permitted to be accomplished using horizontal exits. (See 7.2.4.)

*Exception No. 2:** The requirement for subdivision of building space shall be permitted to be fulfilled by one of the following:

(a) Smoke compartments having exit to a public way where such exit serves only one area and has no openings to other areas

(b) A building separated from the resident housing area by a 2-hour fire resistance rating or 50 ft (15 m) of open space

(c) A secured, open area having a holding space located 50 ft (15 m) from the housing area that provides 15 ft² (1.4 m²) or more of refuge area for each person (resident, staff, visitors) potentially present at the time of a fire

Doors used to access the areas specified in (a), (b), and (c) of this exception shall meet the requirements for doors at smoke barriers for the applicable use condition.

23.3.7.2 Where smoke barriers are required by 23.3.7.1, they shall be provided as follows:

- (1) They shall limit the occupant load to not more than 200 residents in any smoke compartment.
- (2) *They shall limit the travel distance to a door in a smoke barrier as follows:
 - a. The distance from any room door required as exit access shall not exceed 100 ft (30 m).
 - b. The distance from any point in a room shall not exceed 150 ft (45 m).

*Exception:** The maximum travel distance shall be permitted to be increased by 50 ft (15 m) in smoke compartments protected throughout by an approved automatic sprinkler system or automatic smoke control system.

23.3.7.3* Any required smoke barrier shall be constructed in accordance with Section 8.3. Barriers shall be of substantial construction and shall have a structural fire resistance.

23.3.7.4 Openings in smoke barriers shall be protected in accordance with Section 8.3.

*Exception No. 1:** There shall be no restriction on the total number of vision panels in any barrier.

*Exception No. 2:** Sliding doors in smoke barriers that are designed to normally be kept closed and are remotely operated from a continuously attended location shall not be required to be self-closing.

23.3.7.5 Not less than 6 net ft² (0.56 net m²) per occupant shall be provided on each side of the smoke barrier for the total number of occupants in adjoining compartments. This space shall be readily available wherever occupants are moved across the smoke barrier in a fire emergency.

23.3.7.6 Doors shall provide resistance to the passage of smoke. Swinging doors shall be self-latching, or the opening resistance of the door shall be not less than 5 lbf (22 N). Such doors shall not be required to swing in the direction of egress travel.

23.3.7.7 Doors in smoke barriers shall conform with the requirements for doors in means of egress as specified in Section 23.2 and shall have locking and release arrangements according to the applicable use condition. The provisions of

the exception to 23.2.11.6 shall not be used for smoke barrier doors serving a smoke compartment containing more than 20 persons.

23.3.7.8 Vision panels shall be provided in smoke barriers at points where the barrier crosses an exit access corridor.

23.3.7.9 Smoke dampers shall be provided in accordance with 8.3.5.

Exception: Other arrangements and positioning of smoke detectors shall be permitted to prevent damage or tampering, or for other purposes. Such arrangements shall be capable of detecting any fire and the placement of detectors shall be such that the speed of detection is equivalent to that provided by the spacing and arrangement required by NFPA 72, National Fire Alarm Code, as referenced in 8.3.5.3.

23.3.8* Special Protection Features — Subdivision of Resident Housing Spaces. Subdivision of facility spaces shall comply with Table 23.3.8.

SECTION 23.4 SPECIAL PROVISIONS

23.4.1 Windowless Structures.

23.4.1.1 Windowless structures used as detention and correctional occupancies shall comply with 23.4.1.2. The provisions of Section 11.7 for windowless structures shall not apply.

Exception: Buildings protected throughout by an approved automatic sprinkler system in accordance with 23.3.5.3.

23.4.1.2 Means shall be provided to evacuate smoke from the smoke compartment of fire origin. Any of the following means shall be acceptable:

- (1) Operable windows on not less than two sides of the building, spaced not more than 30 ft (9.1 m) apart, that provide openings with dimensions of not less than 22 in. (56 cm) in width and 24 in. (61 cm) in height
- (2) *Manual or automatic smoke vents

Table 23.3.8 Subdivision of Resident Housing Spaces

Feature	Use Condition									
	II		III				IV		V	
	NS	AS	NS		AS		NS	AS	NS	AS
Room to room separation	NR	NR	NR		NR		SR	NR	SR	SR [†]
Room face to corridor separation	NR	NR	SR [‡]		NR		SR [‡]	NR	FR [‡]	SR [‡]
Room face to common space separation	NR	NR	NR ≤50 ft (≤15 m) [§]	SR [‡] >50 ft (>15 m) [§]	NR ≤50 ft (≤15 m) [§]	SR [‡] >50 ft (>15 m) [§]	SR [‡]	NR ≤50 ft (≤15 m) [§]	SR [‡] >50 ft (>15 m) [§]	SR [‡]
Common space to corridor separation	SR	NR	SR		NR		SR	NR	FR	SR [‡]
Total openings in solid room face where room face is required to be smoke resistant or fire rated [#]	120 in. ² (0.08 m ²)		120 in. ² (0.08 m ²)				120 in. ² (0.08 m ²)		120 in. ² (0.08 m ²), closable from inside, or 120 in. ² (0.08 m ²) with smoke control	

NS: Not protected by automatic sprinklers.
 AS: Protected by automatic sprinklers.
 NR: No requirement.
 SR: Smoke resistant.
 FR: Fire rated — 1 hour.
 Notes:

- 1. Doors in openings in partitions required to be fire rated (FR) in accordance with Table 23.3.8 in other than required enclosures of exits or hazardous areas shall be substantial doors of construction that resists fire for not less than 20 minutes. Vision panels with wired glass or glass with not less than 45-minute fire-rated glazing shall be permitted. Latches and door closers shall not be required on cell doors.
- 2. Doors in openings in partitions required to be smoke resistant (SR) in accordance with Table 23.3.8 shall be substantial doors of construction that resists the passage of smoke. Latches and door closers shall not be required on cell doors.
- 3. Under Use Condition II, Use Condition III, or Use Condition IV, a space subdivided by open construction (any combination of grating doors and grating walls or solid walls) shall be permitted to be considered one room if housing not more than 16 persons. The perimeter walls of such space shall be of smoke-resistant construction. Smoke detection shall be provided in such space. Under Use Condition IV, common walls between sleeping areas within the space shall be smoke resistant, and grating doors and fronts shall be permitted to be used. Under Use Condition II and Use Condition III, open dormitories shall be permitted to house more than 16 persons as permitted by other sections of this chapter.

4. Where barriers are required to be smoke resistant (SR), the provisions of 8.2.4 shall not apply.

[†]Might be no requirement (NR) where one of the following is provided:

- (1) An approved automatic smoke detection system installed in all corridors and common spaces
- (2) Multitiered cell blocks meeting the requirements of 23.3.1.3

[‡]Might be no requirement (NR) in multitiered, open cell blocks meeting the requirements of 23.3.1.3.

[§]Travel distance through the common space to the exit access corridor.

[#]“Total openings in solid room face” includes all openings (for example, undercuts, food passes, grilles), the total of which shall not exceed 120 in.² (0.08 m²). All openings shall be 36 in. (91 cm) or less above the floor.

- (3) Engineered smoke control system
- (4) Mechanical exhaust system providing not less than 6 air changes per hour
- (5) Other method acceptable to the authority having jurisdiction

23.4.2 Underground Buildings. See Section 11.7 for requirements for underground buildings.

23.4.3 High-Rise Buildings. Existing high-rise buildings shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7. A sprinkler control valve and a waterflow device shall be provided for each floor.

SECTION 23.5 BUILDING SERVICES

23.5.1 Utilities.

23.5.1.1 Utilities shall comply with the provisions of Section 9.1.

23.5.1.2 Alarms, emergency communication systems, and the illumination of generator set installations shall be provided with emergency power in accordance with NFPA 70, *National Electrical Code*.

Exception: Systems complying with earlier editions of NFPA 70, National Electrical Code, and not presenting a life safety hazard shall be permitted to continue to be used.

23.5.2 Heating, Ventilating, and Air Conditioning.

23.5.2.1 Heating, ventilating, and air conditioning equipment shall comply with the provisions of Section 9.2 and shall be installed in accordance with the manufacturer's specifications.

Exception No. 1: As modified in 23.5.2.2.

Exception No. 2: Systems complying with earlier editions of the applicable codes and not presenting a life safety hazard shall be permitted to continue to be used.

23.5.2.2 Portable space-heating devices shall be prohibited. Any heating device other than a central heating plant shall be designed and installed so that combustible material shall not be ignited by the device or its appurtenances. If fuel-fired, such heating devices shall be chimney connected or vent connected, shall take air for combustion directly from outside, and shall be designed and installed to provide for complete separation of the combustion system from the atmosphere of the occupied area. The heating system shall have safety devices to immediately stop the flow of fuel and shut down the equipment in case of either excessive temperatures or ignition failure.

Exception: Approved, suspended unit heaters shall be permitted in locations other than means of egress and sleeping areas, provided that such heaters are located high enough to be out of the reach of persons using the area and are vent connected and equipped with the safety devices required by 23.5.2.2.

23.5.2.3 Combustion and ventilation air for boiler, incinerator, or heater rooms shall be taken directly from and discharged directly to the outside.

23.5.3 Elevators, Escalators, and Conveyors. Elevators, escalators, and conveyors shall comply with the provisions of Section 9.4.

23.5.4 Rubbish Chutes, Incinerators, and Laundry Chutes.

23.5.4.1 Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 9.5.

23.5.4.2 Any rubbish chute or linen chute, including pneumatic rubbish and linen systems, shall be provided with automatic extinguishing protection in accordance with Section 9.7.

23.5.4.3 Any trash chute shall discharge into a trash collection room used for no other purpose and protected in accordance with Section 8.4.

23.5.4.4 Any incinerator shall not be directly flue-fed, nor shall any floor chute directly connect with the combustion chamber.

SECTION 23.6 RESERVED

SECTION 23.7 OPERATING FEATURES

23.7.1 Attendants, Evacuation Plan, Fire Drills.

23.7.1.1 Detention and correctional facilities, or those portions of facilities having such occupancy, shall be provided with 24-hour staffing. Staff shall be within three floors or a 300-ft (91-m) horizontal distance of the access door of each resident housing area.

In addition, for Use Condition III, Use Condition IV, and Use Condition V, the arrangement shall be such that the staff involved starts the release of locks necessary for emergency evacuation or rescue and initiates other necessary emergency actions within 2 minutes of alarm.

Exception: For areas in which all locks are unlocked remotely in compliance with 23.2.11.6, staff shall not be required to be within three floors or 300 ft (194 m) of the access door. The exception to 23.2.11.6 shall not be used in conjunction with this exception.

23.7.1.2* Provisions shall be made so that residents in Use Condition III, Use Condition IV, and Use Condition V shall be able to notify staff of an emergency.

23.7.1.3* The administration of every detention or correctional facility shall have, in effect and available to all supervisory personnel, written copies of a plan for the protection of all persons in the event of fire, for their evacuation to areas of refuge, and for evacuation from the building when necessary. All employees shall be instructed and drilled with respect to their duties under the plan. The plan shall be coordinated with and reviewed by the fire department legally committed to serve the facility.

23.7.1.4 Employees of detention and correctional occupancies shall be instructed in the proper use of portable fire extinguishers and other manual fire suppression equipment. Such training shall be provided to new staff promptly upon commencement of duty. Refresher training shall be provided to existing staff at not less than annual intervals.

23.7.2 Books, clothing, and other combustible personal property allowed in sleeping rooms shall be stored in closable metal lockers or a fire-resistant container.

23.7.3 The number of heat-producing appliances, such as toasters and hot plates, and the overall use of electrical power within a sleeping room shall be controlled by facility administration.

23.7.4* Furnishings, Bedding, and Decorations.

23.7.4.1 Draperies and curtains, including privacy curtains, in detention and correctional occupancies shall be in accordance with the provisions of 10.3.1.

23.7.4.2 Newly introduced upholstered furniture within detention and correctional occupancies shall be tested in accordance with the provisions of 10.3.2(2) and 10.3.3.

23.7.4.3* Newly introduced mattresses within detention and correctional occupancies shall be tested in accordance with the provisions of 10.3.2(3) and 10.3.4.

23.7.4.4 Combustible decorations shall be prohibited in any detention or correctional occupancy unless flame-retardant.

23.7.4.5 Wastebaskets and other waste containers shall be of noncombustible or other approved materials. Waste containers with a capacity exceeding 20 gal (76 L) shall be provided with a noncombustible lid or lid of other approved material.

23.7.5 Keys. All keys necessary for unlocking doors installed in a means of egress shall be individually identified by both touch and sight.

23.7.6 Portable Space-Heating Devices. Portable space-heating devices shall be prohibited in all detention and correctional occupancies.

Chapter 24 ONE- AND TWO-FAMILY DWELLINGS

SECTION 24.1 GENERAL REQUIREMENTS

24.1.1 Application.

24.1.1.1* This chapter establishes life safety requirements for all one- and two-family dwellings. One- and two-family dwellings include buildings containing not more than two dwelling units in which each dwelling unit is occupied by members of a single family with not more than three outsiders, if any, accommodated in rented rooms.

24.1.1.2 The requirements of this chapter apply to new buildings and to existing or modified buildings according to the provisions of 1.4.1 of this *Code*.

24.1.2 Mixed Occupancies.

24.1.2.1 Where another type of occupancy exists in the same building as a residential occupancy, the requirements of 6.1.14 of this *Code* shall apply.

24.1.2.2 No dwelling unit of a residential occupancy shall have its sole means of egress pass through any nonresidential occupancy in the same building.

24.1.2.3 No multiple-dwelling unit of a residential occupancy shall be located above any nonresidential occupancy.

Exception No. 1: Where the dwelling unit of the residential occupancy and exits therefrom are separated from the nonresidential occupancy by construction having a fire resistance rating of not less than 1 hour.

Exception No. 2: Where the nonresidential occupancy is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

Exception No. 3: Where the nonresidential occupancy is protected by an automatic fire detection system in accordance with Section 9.6.

24.1.3 Definitions. Terms applicable to this chapter are defined in Chapter 3 of this *Code*; where necessary, other terms are defined in the text.

24.1.4 Classification of Occupancy. (See 24.1.1.1.)

24.1.5 Classification of Hazard of Contents. The contents of residential occupancies shall be classified as ordinary hazard in accordance with 6.2.2.

24.1.6 Minimum Construction Requirements. (No special requirements.)

24.1.7 Occupant Load. (No requirements.)

SECTION 24.2* MEANS OF ESCAPE REQUIREMENTS

24.2.1 General. The provisions of Chapter 7 shall not apply to means of escape unless specifically referenced in this chapter.

24.2.2 Number and Types of Means of Escape.

24.2.2.1 Number of Means of Escape. In any dwelling or dwelling unit of two rooms or more, every sleeping room and every living area shall have not less than one primary means of escape and one secondary means of escape.

Exception: A secondary means of escape shall not be required where one of the following conditions are met:

(a) *The bedroom or living area has a door leading directly to the outside of the building at or to grade level.*

(b) *The dwelling unit is protected throughout by an approved automatic sprinkler system in accordance with 24.3.5.*

24.2.2.2 Primary Means of Escape. The primary means of escape shall be a door, stairway, or ramp providing a means of unobstructed travel to the outside of the dwelling unit at street or ground level.

24.2.2.3* Secondary Means of Escape. The secondary means of escape shall be one of the following.

(a) It shall be a door, stairway, passage, or hall providing a way of unobstructed travel to the outside of the dwelling at street or ground level that is independent of and remote from the primary means of escape.

(b) It shall be a passage through an adjacent nonlockable space, independent of and remote from the primary means of escape, to any approved means of escape.

(c) *It shall be an outside window or door operable from the inside without the use of tools, keys, or special effort and shall provide a clear opening of not less than 5.7 ft² (0.53 m²). The width shall be not less than 20 in. (51 cm), and the height shall be not less than 24 in. (61 cm). The bottom of the opening shall be not more than 44 in. (112 cm) above the floor. Such means of escape shall be acceptable where one of the following criteria are met:

- (1) The window shall be within 20 ft (6.1 m) of grade.
- (2) The window shall be directly accessible to fire department rescue apparatus as approved by the authority having jurisdiction.
- (3) The window or door shall open onto an exterior balcony.
- (4) The window shall have a sill height below the adjacent ground level and shall be provided with a window well meeting the following criteria:

- a. The window well shall have horizontal dimensions that allow the window to be fully opened.
- b. The window well shall have an accessible net clear opening of not less than 9 ft² (0.82 m²) with a length and width of not less than 36 in. (91.4 cm).
- c. A window well with a vertical depth of more than 44 in. (112 cm) shall be equipped with an approved permanently affixed ladder or with steps meeting the following criteria:

1. The ladder or steps shall not encroach more than 6 in. (15.2 cm) into the required dimensions of the window well.
2. The ladder or steps shall not be obstructed by the window.

Ladders or steps that comply with the requirements of 24.2.2.3(c)(4)c shall be exempt from the requirements of 7.2.2.

Exception: Existing approved means of escape.

24.2.2.4 Every story more than 2000 ft² (185 m²) in area or with a travel distance to the primary means of escape of more than 75 ft (23 m) shall be provided with two primary means of escape remotely located from each other.

Exception No. 1: Existing one- and two-family dwellings shall be permitted to have a single primary means of escape.

Exception No. 2: Buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 24.3.5.

24.2.3 Arrangement of Means of Escape. Any required path of travel in a means of escape from any room to the outside shall not pass through another room or apartment not under the immediate control of the occupant of the first room or through a bathroom or other space subject to locking.

24.2.4 Doors.

24.2.4.1 Doors in the path of travel of a means of escape shall be not less than 28 in. (71 cm) wide.

Exception: Bathroom doors shall be not less than 24 in. (61 cm) wide.

24.2.4.2 Doors shall be not less than 6 ft 6 in. (2 m) in nominal height.

24.2.4.3 Every closet door latch shall be such that children can open the door from inside the closet.

24.2.4.4 Every bathroom door shall be designed to allow opening from the outside during an emergency when locked.

24.2.4.5 Doors shall be swinging or sliding.

24.2.4.6* No door in any means of escape shall be locked against egress when the building is occupied. All locking devices that impede or prohibit egress or that cannot be easily disengaged shall be prohibited.

24.2.5 Stairs, Landings, Ramps, Balconies, or Porches.

24.2.5.1 Stairs, ramps, guards, and handrails shall be in accordance with 7.2.2 for stairs and 7.2.5 for ramps.

Exception No. 1: The provisions of 7.2.2.5, 7.2.5.5, and 7.7.3 shall not apply.

Exception No. 2: If serving as a secondary means of escape, stairs complying with the fire escape requirements of Table 7.2.8.4.1(a) or Table 7.2.8.4.1(b) shall be permitted.

Exception No. 3: If serving as a secondary means of escape, ramps complying with the existing ramp requirements of 7.2.5.2(2) shall be permitted.

Exception No. 4: Riser heights not exceeding 7³/₄ in. (19.7 cm) and tread depths of not less than 10 in. (25.4 cm) shall be permitted for stairs in new construction.

24.2.5.2 The clear width of stairs, landings, ramps, balconies, and porches shall be not less than 36 in. (91 cm), measured in accordance with 7.3.2.

24.2.5.3 Spiral stairs and winders in accordance with 7.2.2.2.3 and 7.2.2.2.4 shall be permitted within a single dwelling unit.

24.2.5.4 No sleeping rooms or living rooms shall be accessible only by a ladder, a stair ladder, an alternating tread device, or folding stairs or through a trap door.

24.2.6 Hallways. The width of hallways shall be not less than 36 in. (91 cm). The height of hallways shall be not less than 7 ft (2.1 m) nominal, with clearance below projections from the ceiling of not less than 6 ft 8 in. (203 cm) nominal.

Exception: Existing approved hallways shall be permitted to be continued to be used.

SECTION 24.3 PROTECTION

24.3.1 Protection of Vertical Openings. (No requirements.)

24.3.2 (Reserved.)

24.3.3 Interior Finish.

24.3.3.1 Interior Wall and Ceiling Finish. Interior finish on walls and ceilings of occupied spaces shall be Class A, Class B, or Class C as defined in Section 10.2.

24.3.3.2 Interior Floor Finish. (No requirements.)

24.3.4 Detection, Alarm, and Communications Systems. Approved, single-station smoke alarms shall be installed in accordance with 9.6.2.10 in the following locations:

(1) All sleeping rooms

Exception: Smoke alarms shall not be required in sleeping rooms in existing one- and two-family dwellings.

(2) Outside of each separate sleeping area, in the immediate vicinity of the sleeping rooms

(3) On each level of the dwelling unit, including basements

Exception No. 1: Dwelling units protected by an approved smoke detection system in accordance with Section 9.6 and equipped with an approved means of occupant notification.

Exception No. 2: In existing one- and two-family dwellings approved smoke alarms powered by batteries shall be permitted.

24.3.5 Extinguishment Requirements. Where an automatic sprinkler system is required or is used as an alternative method of protection, either for total or partial building coverage, the system shall be in accordance with Section 9.7. In buildings up to and including four stories in height, systems in accordance with NFPA 13R, *Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height*, shall be permitted. Systems in accordance with NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*, shall also be permitted.

SECTION 24.4 RESERVED**SECTION 24.5 BUILDING SERVICES**

24.5.1 Heating, Ventilating, and Air Conditioning.

24.5.1.1 Heating, ventilating, and air conditioning equipment shall comply with the provisions of Section 9.2.

24.5.1.2 Unvented fuel-fired heaters shall not be used.

Exception: Listed and approved unvented fuel-fired heaters in one- and two-family dwellings.

Chapter 25 RESERVED

Chapter 26 LODGING OR ROOMING HOUSES

SECTION 26.1 GENERAL REQUIREMENTS

26.1.1 Application.

26.1.1.1* This chapter applies to buildings that provide sleeping accommodations for a total of 16 or fewer persons on either a transient or permanent basis, with or without meals, but without separate cooking facilities for individual occupants, except as provided in Chapter 24.

26.1.1.2 The requirements of this chapter apply to new buildings and to existing or modified buildings according to the provisions of 1.4.1 of this Code.

26.1.2 Mixed Occupancies.

26.1.2.1 Where another type of occupancy exists in the same building as a residential occupancy, the requirements of 6.1.14 of this Code shall apply.

26.1.2.2 No dwelling unit of a residential occupancy shall have its sole means of egress pass through any nonresidential occupancy in the same building.

26.1.2.3 No multiple-dwelling unit of a residential occupancy shall be located above any nonresidential occupancy.

Exception No. 1: Where the dwelling unit of the residential occupancy and exits therefrom are separated from the nonresidential occupancy by construction having a fire-resistance rating of not less than 1 hour.

Exception No. 2: Where the nonresidential occupancy is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

Exception No. 3: A building with not more than two dwelling units above a nonresidential occupancy shall be permitted, provided that the nonresidential occupancy is protected by an automatic fire detection system in accordance with Section 9.6.

26.1.3 Definitions. Terms applicable to this chapter are defined in Chapter 3 of this Code; where necessary, other terms are defined in the text.

26.1.4 Classification of Occupancy. (See 26.1.1.1.)

26.1.5 Classification of Hazard of Contents. The contents of residential occupancies shall be classified as ordinary hazard in accordance with 6.2.2.

26.1.6 Minimum Construction Requirements. (No special requirements.)

26.1.7 Occupant Load. (See 26.1.1.1.)

SECTION 26.2 MEANS OF ESCAPE REQUIREMENTS

26.2.1 Number and Types of Means of Escape.

26.2.1.1 Every sleeping room and living area shall have access to a primary means of escape complying with Chapter 24 and located to provide a safe path of travel to the outside. Where the sleeping room is above or below the level of exit discharge, the primary means of escape shall be an interior stair in accordance with 26.2.2, an exterior stair, a horizontal exit in accordance with 7.2.4, or an existing fire escape stair in accordance with 7.2.8.

26.2.1.2 In addition to the primary route, each sleeping room and living area shall have a second means of escape in accordance with 24.2.2.

Exception: If the sleeping room or living area has a door leading directly outside the building with access to grade or to a stairway that meets the requirements for exterior stairs in 26.2.1.1, that means of escape shall be considered as meeting all of the escape requirements for that sleeping room or living area.

26.2.1.3 Every story more than 2000 ft² (185 m²) in area or with travel distance to the primary means of escape more than 75 ft (23 m) shall be provided with two primary means of escape remotely located from each other.

Exception No. 1: Existing lodging or rooming houses shall be permitted to have a single primary means of escape.

Exception No. 2: Buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 26.3.5.

26.2.2 Interior stairways shall be enclosed by 1/2-hour fire barriers with all openings protected with smoke-actuated automatic-closing or self-closing doors having a fire resistance comparable to that required for the enclosure. The stairway shall comply with 7.2.2.5.3.

Exception No. 1: Where an interior stair connects the street floor with the story next above or below only, but not with both, the interior stair shall be required to be enclosed only on the street floor.

Exception No. 2: Stairways shall be permitted to be unenclosed in accordance with the exceptions to 26.3.1.1.

26.2.3 Doors and paths of travel in a means of escape shall be not less than 28 in. (71 cm) wide.

Exception: Bathroom doors shall be not less than 24 in. (61 cm) wide.

26.2.4 Every closet door latch shall be such that it can be readily opened from the inside in case of emergency.

26.2.5 Every bathroom door shall be designed to allow opening from the outside during an emergency when locked.

26.2.6 Winders in accordance with 7.2.2.2.4 shall be permitted.

26.2.7* No door in any means of escape shall be locked against egress when the building is occupied.

Exception: Delayed-egress locks complying with 7.2.1.6.1 shall be permitted, provided that not more than one such device is located in any one escape path.

26.2.8 Doors serving a single dwelling unit shall be permitted to be provided with a lock in accordance with Exception No. 3 to 7.2.1.5.1.

SECTION 26.3 PROTECTION

26.3.1 Protection of Vertical Openings.

26.3.1.1 Vertical openings shall be protected so that no primary escape route is exposed to an unprotected vertical opening. The vertical opening shall be considered protected if the opening is cut off and enclosed in a manner that provides a smoke- and fire-resisting capability of not less than 1/2 hour. Any doors or openings shall have a smoke- and fire-resisting capability equivalent to that of the enclosure and shall be automatic-closing on detection of smoke or shall be self-closing.

Exception No. 1: In buildings three or fewer stories in height that are protected throughout by an approved automatic sprinkler system in accordance with 26.3.5, unprotected vertical openings shall be permitted. However, in such cases, a primary means of escape from each sleeping area shall be provided. Such means of escape shall not pass through a portion of a lower floor unless such portion is separated from all spaces on that floor by construction having a 1/2-hour fire resistance rating.

Exception No. 2: In buildings two or fewer stories in height protected throughout by an approved, supervised automatic sprinkler system in accordance with 26.3.5.1, stair enclosures shall not be required. The exception to 24.2.2.1(b) shall not be used.

26.3.1.2 Exterior stairs shall be reasonably protected against blockage caused by fire that would simultaneously expose both the interior and exterior means of escape. Such protection shall be permitted to be accomplished through separation by physical distance, arrangement of the stairs, protection of the openings exposing the stairs, or other means acceptable to the authority having jurisdiction.

26.3.2 Interior Finish.

26.3.2.1 Interior finish shall be in accordance with Section 10.2.

26.3.2.2 Interior Wall and Ceiling Finish. Interior wall and ceiling finish materials complying with 10.2.3 shall be Class A, Class B, or Class C in occupied spaces.

26.3.2.3 Interior Floor Finish. (No requirements.)

26.3.3 Detection, Alarm, and Communications Systems.

26.3.3.1 General. Lodging and rooming houses shall be provided with a fire alarm system in accordance with Section 9.6.

Exception: Existing lodging and rooming houses that have an existing smoke detection system meeting or exceeding the requirements of 26.3.3.5 where that detection system includes not less than one manual fire alarm box per floor arranged to initiate the smoke detection alarm.

26.3.3.2 Initiation. Initiation of the required fire alarm system shall be by manual means in accordance with 9.6.2.

Exception: Buildings protected throughout by an approved automatic sprinkler system in accordance with 26.3.5, with alarm initiation in accordance with 9.6.2.1(3).

26.3.3.3 Notification. Occupant notification shall be provided automatically in accordance with 9.6.3.

Exception No. 1: Visible signals for the hearing impaired shall not be required where the proprietor resides in the building and there are five or fewer rooms for rent.*

Exception No. 2: Positive alarm sequence in accordance with 9.6.3.4 shall be permitted.

26.3.3.4 Detection. (Reserved.)

26.3.3.5 Smoke Alarms. Approved single-station smoke alarms shall be installed in accordance with 9.6.2.10 in every sleeping room. Such smoke alarms shall not be required to be interconnected.

Exception: Existing battery-powered smoke alarms, rather than house electric-powered smoke alarms, shall be permitted where the facility has demonstrated to the authority having jurisdiction that the testing, maintenance, and battery replacement programs will ensure reliability of power to the smoke alarms.

26.3.4 Separation of Sleeping Rooms. All sleeping rooms shall be separated from escape route corridors by walls and

doors that are smoke resistant. There shall be no louvers or operable transoms. Air passages shall not penetrate the wall unless they are properly installed heating and utility installations other than transfer grilles. Transfer grilles shall be prohibited. Doors shall be provided with latches or other mechanisms suitable for keeping the doors closed. Doors shall not be arranged to prevent the occupant from closing the door. Doors shall be self-closing or automatic-closing upon detection of smoke.

Exception: Door-closing devices shall not be required in buildings protected throughout by an approved automatic sprinkler system in accordance with 26.3.5.

26.3.5 Extinguishment Requirements.

26.3.5.1* Where an automatic sprinkler system is required or is used as an alternative method of protection, either for total or partial building coverage, the system shall be in accordance with Section 9.7 and shall actuate the fire alarm system in accordance with Section 9.6. In buildings up to and including four stories in height, systems in accordance with NFPA 13R, *Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height*, shall be permitted. The use of NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*, shall be permitted where the lodging or rooming house is not part of a mixed occupancy. Entrance foyers shall be sprinklered. Lodging and rooming houses with sleeping accommodations for more than eight occupants shall be treated as two-family dwellings with regard to the water supply.

Exception No. 1: In buildings sprinklered in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems, closets less than 12 ft² (1.1 m²) in area in individual dwelling units shall not be required to be sprinklered. Closets that contain equipment such as washers, dryers, furnaces, or water heaters shall be sprinklered regardless of size.

Exception No. 2: In existing lodging and rooming houses, sprinkler installations shall not be required in closets not exceeding 24 ft² (2.2 m²) and in bathrooms not exceeding 55 ft² (5.1 m²).

26.3.5.2 All new lodging or rooming houses shall be protected throughout by an approved automatic sprinkler system in accordance with 26.3.5.1.

Exception: Where every sleeping room has a door opening directly to the outside of the building at street or ground level, or has a door opening directly to the outside leading to an exterior stairway that meets the requirements of 26.2.1.1.

SECTION 26.4 RESERVED

SECTION 26.5 BUILDING SERVICES

26.5.1 Utilities. Utilities shall comply with the provisions of Section 9.1.

26.5.2 Heating, Ventilating, and Air Conditioning.

26.5.2.1 Heating, ventilating, and air conditioning equipment shall comply with the provisions of Section 9.2.

26.5.2.2 Unvented fuel-fired heaters shall not be used.

Exception: Gas space heaters in compliance with NFPA 54, National Fuel Gas Code.

26.5.3 Elevators, Escalators, and Conveyors. Elevators, escalators, and conveyors shall comply with the provisions of Section 9.4.

Chapter 27 RESERVED

Chapter 28 NEW HOTELS AND DORMITORIES

SECTION 28.1 GENERAL REQUIREMENTS

28.1.1 Application.

28.1.1.1 The requirements of this chapter apply to the following:

- (1) New buildings or portions thereof used as hotel or dormitory occupancies (*see 1.4.1*)
- (2) Additions made to, or used as, a hotel or dormitory occupancy (*see 4.6.6*)
- (3) Alterations, modernizations, or renovations of existing hotel or dormitory occupancies (*see 4.6.7*)
- (4) Buildings or portions thereof upon change of occupancy to a hotel or dormitory occupancy (*see 4.6.11*)

Exception: Any dormitory divided into suites of rooms, with one or more bedrooms opening into a living room or study that has a door opening into a common corridor serving a number of suites, shall be classified as an apartment building.

28.1.1.2 The term *hotel*, wherever used in this *Code*, shall include a hotel, inn, club, motel, bed and breakfast, or any other structure meeting the definition of *hotel*.

28.1.2 Mixed Occupancies.

28.1.2.1 Where another type of occupancy exists in the same building as a residential occupancy, the requirements of 6.1.14 of this *Code* shall apply.

28.1.2.2 No dwelling unit of a residential occupancy shall have its sole means of egress pass through any nonresidential occupancy in the same building.

28.1.2.3 No multiple-dwelling unit of a residential occupancy shall be located above any nonresidential occupancy.

Exception No. 1: Where the dwelling unit of the residential occupancy and exits therefrom are separated from the nonresidential occupancy by construction having a fire resistance rating of not less than 1 hour.

Exception No. 2: Where the nonresidential occupancy is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

28.1.3 **Definitions.** Terms applicable to this chapter are defined in Chapter 3 of this *Code*; where necessary, other terms are defined in the text.

Dormitory. See 3.3.46.

Guest Room. See 3.3.94.

Guest Suite. See 3.3.95.

Hotel. See 3.3.105.

28.1.4 **Classification of Occupancy.** (*See 28.1.3.*)

28.1.5 **Classification of Hazard of Contents.** The contents of residential occupancies shall be classified as ordinary hazard in accordance with 6.2.2. For the design of automatic sprinkler systems, the classification of contents in NFPA 13, *Standard for the Installation of Sprinkler Systems*, shall apply.

28.1.6 **Minimum Construction Requirements.** (No special requirements.)

28.1.7 **Occupant Load.** The occupant load, in number of persons for whom means of egress and other provisions are required, shall be determined on the basis of the occupant load factors of Table 7.3.1.2 that are characteristic of the use of the space or shall be determined as the maximum probable population of the space under consideration, whichever is greater.

SECTION 28.2 MEANS OF EGRESS REQUIREMENTS

28.2.1 **General.** Means of egress from guest rooms or guest suites to the outside of the building shall be in accordance with Chapter 7 and this chapter. Means of escape within the guest room or guest suite shall comply with the provisions of Section 24.2 for one- and two-family dwellings. For the purpose of application of the requirements of Chapter 24, the terms *guest room* and *guest suite* shall be synonymous with the terms *dwelling* or *living unit*.

28.2.2 Means of Egress Components.

28.2.2.1 General.

28.2.2.1.1 Components of means of egress shall be limited to the types described in 28.2.2.2 through 28.2.2.12.

28.2.2.1.2 In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 28.3.5, exit enclosures shall have a fire resistance rating of not less than 1 hour, and the fire protection rating of doors shall be not less than 1 hour.

28.2.2.2 Doors.

28.2.2.2.1 Doors complying with 7.2.1 shall be permitted.

28.2.2.2.2 No door in any means of egress shall be locked against egress when the building is occupied.

Exception No. 1: Delayed-egress locks complying with 7.2.1.6.1 shall be permitted, provided that not more than one such device is located in any one egress path.

Exception No. 2: Access-controlled egress doors complying with 7.2.1.6.2 shall be permitted.

28.2.2.2.3 Revolving doors complying with 7.2.1.10 shall be permitted.

28.2.2.2.4 Horizontal sliding doors, as permitted by 7.2.1.14, shall not be used across corridors.

28.2.2.3 **Stairs.** Stairs complying with 7.2.2 shall be permitted.

28.2.2.4 **Smokeproof Enclosures.** Smokeproof enclosures complying with 7.2.3 shall be permitted.

28.2.2.5 **Horizontal Exits.** Horizontal exits complying with 7.2.4 shall be permitted.

28.2.2.6 **Ramps.** Ramps complying with 7.2.5 shall be permitted.

28.2.2.7 **Exit Passageways.** Exit passageways complying with 7.2.6 shall be permitted.

28.2.2.8 (Reserved.)

28.2.2.9 (Reserved.)

28.2.2.10 **Fire Escape Ladders.** Fire escape ladders complying with 7.2.9 shall be permitted.

28.2.2.11 **Alternating Tread Devices.** Alternating tread devices complying with 7.2.11 shall be permitted.

28.2.2.12* Areas of Refuge. Areas of refuge complying with 7.2.12 shall be permitted.

Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 28.3.5, the two accessible rooms or spaces separated from each other by smoke-resistive partitions in accordance with the definition of area of refuge in 3.3.14 shall not be required.

28.2.3 Capacity of Means of Egress.

28.2.3.1 The capacity of means of egress shall be in accordance with Section 7.3.

28.2.3.2 Street floor exits shall be sufficient for the occupant load of the street floor plus the required capacity of stairs and ramps discharging onto the street floor.

28.2.3.3 The corridor width shall be sufficient to accommodate the required occupant load, but shall be not less than 44 in. (112 cm).

*Exception:** Corridors within individual guest rooms or individual guest suites.

28.2.4 Number of Exits. Not less than two separate exits shall be provided on each story. (See also Section 7.4.)

Exception: Buildings of four stories or less protected throughout by an approved, supervised automatic sprinkler system in accordance with 28.3.5, with not more than four guest rooms or guest suites per floor, shall be permitted to have a single exit under the following conditions:

(a) *The stairway is completely enclosed or separated by barriers having a fire resistance rating of not less than 1 hour, with self-closing 1-hour fire protection-rated doors protecting all openings between the stairway enclosure and the building.*

(b) *The stairway does not serve more than one-half of a story below the level of exit discharge.*

(c) *All corridors serving as access to exits have not less than a 1-hour fire resistance rating.*

(d) *The travel distance from the entrance door of any guest room or guest suite to an exit does not exceed 35 ft (10.7 m).*

(e) *Horizontal and vertical separation with a fire rating of not less than 1/2 hour is provided between guest rooms or guest suites.*

28.2.5 Arrangement of Means of Egress.

28.2.5.1 Access to all required exits shall be in accordance with Section 7.5.

Exception: The distance between exits addressed by 7.5.1.4 shall not apply to common nonlooped exit access corridors in buildings that have corridor doors from the guest room or guest suite that are arranged such that the exits are located in opposite directions from such doors.

28.2.5.2 Common paths of travel shall not exceed 35 ft (10.7 m). Travel within a guest room or guest suite shall not be included when calculating common path of travel.

Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 28.3.5, common path of travel shall not exceed 50 ft (15 m).

28.2.5.3 Dead-end corridors shall not exceed 35 ft (10.7 m).

Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 28.3.5, dead-end corridors shall not exceed 50 ft (15 m).

28.2.5.4 Any guest room or any guest suite of rooms in excess of 2000 ft² (185 m²) shall be provided with not less than two exit access doors remotely located from each other.

28.2.6 Travel Distance to Exits.

28.2.6.1 Travel distance within a guest room or guest suite to a corridor door shall not exceed 75 ft (23 m).

Exception: A travel distance not exceeding 125 ft (38 m) shall be permitted in buildings protected by an approved, supervised automatic sprinkler system in accordance with 28.3.5.

28.2.6.2 Travel distance from the corridor door of any guest room or guest suite to the nearest exit, measured in accordance with Section 7.6, shall not exceed 100 ft (30 m).

Exception No. 1: The permitted travel distance to exits shall not exceed 200 ft (60 m) for exterior ways of exit access arranged in accordance with 7.5.3.

Exception No. 2: The permitted travel distance to exits shall not exceed 200 ft (60 m) where the exit access and any portion of the building that is tributary to the exit access are protected throughout by an approved, supervised automatic sprinkler system in accordance with 28.3.5. In addition, the portion of the building in which the 200-ft (60-m) travel distance is permitted shall be separated from the remainder of the building by construction having a fire resistance rating of not less than 1 hour, for buildings not more than three stories in height, and 2 hours for buildings more than three stories in height.

28.2.7 Discharge from Exits.

28.2.7.1 Exit discharge shall comply with Section 7.7.

28.2.7.2* Any required exit stair that is located so that it is necessary to pass through the lobby or other open space to reach the outside of the building shall be continuously enclosed down to a level of exit discharge or to a mezzanine within a lobby at a level of exit discharge.

28.2.7.3 The distance of travel from the termination of the exit enclosure to an exterior door leading to a public way shall not exceed 100 ft (30 m).

28.2.8 Illumination of Means of Egress. Means of egress shall be illuminated in accordance with Section 7.8.

28.2.9 Emergency Lighting. Emergency lighting in accordance with Section 7.9 shall be provided in all buildings with more than 25 rooms.

Exception: Where each guest room or guest suite has an exit direct to the outside of the building at street or ground level.

28.2.10 Marking of Means of Egress. Means of egress shall have signs in accordance with Section 7.10.

28.2.11 Special Means of Egress Features. (Reserved.)

SECTION 28.3 PROTECTION

28.3.1 Protection of Vertical Openings.

28.3.1.1 Any vertical opening shall be enclosed or protected in accordance with 8.2.5.

Exception No. 1: Openings in accordance with 8.2.5.8 shall be permitted.

Exception No. 2: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 28.3.5, the fire resistance of walls shall be not less than 1 hour and the fire protection rating of doors shall be not less than 1 hour.

28.3.1.2 No floor below the level of exit discharge used only for storage, heating equipment, or purposes other than residential occupancy shall have unprotected openings to floors used for residential purposes.

28.3.2 Protection from Hazards.

28.3.2.1 Any room containing high-pressure boilers, refrigerating machinery, transformers, or other service equipment subject to possible explosion shall not be located directly under or directly adjacent to exits. All such rooms shall be effectively cut off from other parts of the building as specified in Section 8.4.

28.3.2.2 Hazardous Areas. Any hazardous area shall be protected in accordance with Section 8.4. The areas described in Table 28.3.2.2 shall be protected as indicated. Where sprinkler protection without fire-rated separation is used, areas shall be separated from other spaces by smoke partitions complying with 8.2.4.

Table 28.3.2.2 Hazardous Area Protection

Hazardous Area Description	Separation/Protection
Boiler and fuel-fired heater rooms serving more than a single guest room or guest suite	1 hour and sprinklers
Employee locker rooms	1 hour or sprinklers
Gift or retail shops	1 hour or sprinklers
Bulk laundries	1 hour and sprinklers
Guest laundries ≤ 100 ft ² (≤ 9.3 m ²) outside of guest rooms or guest suites	1 hour or sprinklers [†]
Guest laundries > 100 ft ² (> 9.3 m ²) outside of guest rooms or guest suites	1 hour and sprinklers
Maintenance shops	1 hour and sprinklers
Storage rooms [‡]	1 hour or sprinklers
Trash collection rooms	1 hour and sprinklers

[†]Where automatic sprinkler protection is provided, no enclosure shall be required.

[‡]Where storage areas not exceeding 24 ft² (2.2 m²) are directly accessible from the guest room or guest suite, no separation or protection shall be required.

28.3.3 Interior Finish.

28.3.3.1 Interior finish shall be in accordance with Section 10.2.

28.3.3.2 Interior Wall and Ceiling Finish. Interior wall and ceiling finish materials complying with 10.2.3 shall be permitted as follows:

- (1) Exit enclosures — Class A
- (2) Lobbies and corridors — Class A or Class B
- (3) Other spaces — Class A, Class B, or Class C

28.3.3.3 Interior Floor Finish. Interior floor finish in accordance with 10.2.7 shall be in accordance with Table 28.3.3.3.

Table 28.3.3.3 Interior Floor Finish

Location	Sprinklered	Nonsprinklered
Corridors	No requirement	Class II
Exits	No requirement	Class II

28.3.3.4* Furnishings and Decorations. New draperies, curtains, and other similar loosely hanging furnishings and decorations in hotels and dormitories shall be in accordance with the provisions of 10.3.1.

28.3.4 Detection, Alarm, and Communications Systems.

28.3.4.1 General. A fire alarm system in accordance with Section 9.6, except as modified by 28.3.4.2 through 28.3.4.5, shall be provided.

28.3.4.2 Initiation. The required fire alarm system shall be initiated by the following:

- (1) Manual means in accordance with 9.6.2
- (2) A manual fire alarm box located at the hotel desk or other convenient central control point under continuous supervision by responsible employees
- (3) Any automatic sprinkler system
- (4) Any required automatic detection system

Exception: The requirement of 28.3.4.2(4) shall not apply to sleeping room smoke detectors.

28.3.4.3 Notification.

28.3.4.3.1* Occupant notification shall be provided automatically in accordance with 9.6.3. Positive alarm sequence in accordance with 9.6.3.4 shall be permitted.

28.3.4.3.2* Guest rooms and guest suites specifically required and equipped to accommodate hearing impaired individuals shall be provided with a visible notification appliance.

28.3.4.3.3 In occupiable areas, other than guest rooms and guest suites, visible notification appliances shall be provided.

28.3.4.3.4 Annunciation in accordance with 9.6.7 shall be provided.

Exception: Buildings not more than two stories in height and with not more than 50 rooms.

28.3.4.3.5* Provisions shall be made for the immediate notification of the public fire department by telephone or other means in case of fire. Where there is no public fire department, notification shall be made to the private fire brigade.

28.3.4.4 Detection. A corridor smoke detection system in accordance with Section 9.6 shall be provided.

Exception: Buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 28.3.5.1.

28.3.4.5* Smoke Alarms. An approved single-station smoke alarm shall be installed in accordance with 9.6.2.10 in every guest room and every living area and sleeping room within a guest suite.

28.3.5 Extinguishment Requirements.

28.3.5.1 Where an automatic sprinkler system is installed, either for total or partial building coverage, the system shall be in accordance with Section 9.7. In buildings up to and including four stories in height, systems in accordance with NFPA 13R, *Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height*, shall be permitted.

Exception: The provisions for draft stops and closely spaced sprinklers in NFPA 13, Standard for the Installation of Sprinkler Systems, shall not be required for openings complying with 8.2.5.8 where the opening is within the guest room or guest suite.

28.3.5.2 All buildings shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with 28.3.5.1.

Exception: Buildings other than high-rise buildings, where all guest sleeping rooms have a door that opens directly to the outside at street or ground level, or to exterior exit access arranged in accordance with 7.5.3.

28.3.5.3 Listed quick-response or listed residential sprinklers shall be used throughout guest rooms and guest room suites.

28.3.5.4 Open parking structures complying with NFPA 88A, *Standard for Parking Structures*, that are contiguous with hotels or dormitories shall be exempt from the sprinkler requirements of 28.3.5.2.

28.3.5.5 Portable fire extinguishers shall be provided as specified in 9.7.4.1 in hazardous areas addressed by 28.3.2.2.

Exception: In buildings protected throughout with an approved, supervised automatic sprinkler system in accordance with Section 9.7.

28.3.6 Corridors.

28.3.6.1 Walls. Exit access corridor walls shall consist of fire barriers in accordance with 8.2.3 that have not less than a 1-hour fire resistance rating.

Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 28.3.5, corridor walls shall have not less than a $1/2$ -hour fire resistance rating.

28.3.6.2 Doors. Doors that open onto exit access corridors shall have not less than a 20-minute fire protection rating in accordance with 8.2.3.2.

28.3.6.3 Doors that open onto exit access corridors shall be self-closing and self-latching.

28.3.6.4 Unprotected openings shall be prohibited in exit access corridor walls and doors.

Exception: Such spaces shall be permitted to be unlimited in area and open to the corridor, provided that the following criteria are met:

(a) *The spaces are not used for guest rooms or guest suites or hazardous areas.*

(b) *The building is protected throughout by an approved, supervised automatic sprinkler system in accordance with 28.3.5.*

(c) *The space does not obstruct access to required exits.*

28.3.6.5 Transoms, louvers, or transfer grilles shall be prohibited in walls or doors of exit access corridors.

28.3.7 Subdivision of Building Spaces. (Reserved.)

28.3.8 Special Protection Features. (Reserved.)

SECTION 28.4 SPECIAL PROVISIONS

28.4.1 High-Rise Buildings. High-rise buildings shall comply with Section 11.8.

SECTION 28.5 BUILDING SERVICES

28.5.1 Utilities. Utilities shall comply with the provisions of Section 9.1.

28.5.2 Heating, Ventilating, and Air Conditioning.

28.5.2.1 Heating, ventilating, and air conditioning equipment shall comply with the provisions of Section 9.2, except as otherwise required in this chapter.

28.5.2.2 Unvented fuel-fired heaters shall not be used.

Exception: Gas space heaters in compliance with NFPA 54, National Fuel Gas Code.

28.5.3* Elevators, Escalators, and Conveyors. Elevators, escalators, and conveyors shall comply with the provisions of Section 9.4. In high-rise buildings, one elevator shall be provided with a protected power supply and shall be available for use by the fire department in case of emergency.

28.5.4 Rubbish Chutes, Incinerators, and Laundry Chutes. Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 9.5.

SECTION 28.6 RESERVED

SECTION 28.7 OPERATING FEATURES

28.7.1 Hotel Emergency Organization.

28.7.1.1* Employees of hotels shall be instructed and drilled in the duties they are to perform in the event of fire, panic, or other emergency.

28.7.1.2* Drills of the emergency organization shall be held at quarterly intervals and shall cover such points as the operation and maintenance of the available first aid fire appliances, the testing of devices to alert guests, and a study of instructions for emergency duties.

28.7.2 Emergency Duties. Upon discovery of a fire, employees shall carry out the following duties:

- (1) Activate the facility fire protection signaling system, if provided
- (2) Notify the public fire department
- (3) Take other action as previously instructed

28.7.3 Drills in Dormitories. Emergency egress and relocation drills shall be regularly conducted in accordance with Section 4.7.

28.7.4 Emergency Instructions for Residents or Guests.

28.7.4.1* A floor diagram reflecting the actual floor arrangement, exit locations, and room identification shall be posted in a location and manner acceptable to the authority having jurisdiction on, or immediately adjacent to, every guest room door in hotels and in every resident room in dormitories.

28.7.4.2* Fire safety information shall be provided to allow guests to make the decision to evacuate to the outside, to evacuate to an area of refuge, to remain in place, or to employ any combination of the three options.

Chapter 29 EXISTING HOTELS AND DORMITORIES

SECTION 29.1 GENERAL REQUIREMENTS

29.1.1 Application.

29.1.1.1 The requirements of this chapter apply to existing buildings or portions thereof currently occupied as hotel or dormitory occupancies. (See also 28.1.1.)

Exception: Any dormitory divided into suites of rooms, with one or more bedrooms opening into a living room or study that has a door opening into a common corridor serving a number of suites, shall be classified as an apartment building.

29.1.1.2 The term *hotel*, wherever used in this *Code*, shall include a hotel, inn, club, motel, bed and breakfast, or any other structure meeting the definition of *hotel*.

29.1.2 Mixed Occupancies.

29.1.2.1 Where another type of occupancy exists in the same building as a residential occupancy, the requirements of 6.1.14 of this *Code* shall apply.

29.1.2.2 No dwelling unit of a residential occupancy shall have its sole means of egress pass through any nonresidential occupancy in the same building.

29.1.2.3 No multiple-dwelling unit of a residential occupancy shall be located above any nonresidential occupancy.

Exception No. 1: Where the dwelling unit of the residential occupancy and exits therefrom are separated from the nonresidential occupancy by construction having a fire resistance rating of not less than 1 hour.

Exception No. 2: Where the nonresidential occupancy is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

Exception No. 3: A building with not more than two dwelling units above a nonresidential occupancy shall be permitted, provided that the nonresidential occupancy is protected by an automatic fire detection system in accordance with Section 9.6.

29.1.3 Definitions. Terms applicable to this chapter are defined in Chapter 3 of this *Code*; where necessary, other terms are defined in the text.

Dormitory. See 3.3.46.

Guest Room. See 3.3.94.

Guest Suite. See 3.3.95.

Hotel. See 3.3.105.

29.1.4 Classification of Occupancy. (See 29.1.3.)

29.1.5 Classification of Hazard of Contents. The contents of residential occupancies shall be classified as ordinary hazard in accordance with 6.2.2. For the design of automatic sprinkler systems, the classification of contents in NFPA 13, *Standard for the Installation of Sprinkler Systems*, shall apply.

29.1.6 Minimum Construction Requirements. (No special requirements.)

29.1.7 Occupant Load. The occupant load, in number of persons for whom means of egress and other provisions are required, shall be determined on the basis of the occupant load factors of Table 7.3.1.2 that are characteristic of the use of the space or shall be determined as the maximum probable population of the space under consideration, whichever is greater.

SECTION 29.2 MEANS OF EGRESS REQUIREMENTS

29.2.1 General. Means of egress from guest rooms or guest suites to the outside of the building shall be in accordance with Chapter 7 and this chapter. Means of escape within the guest room or guest suite shall comply with the provisions of Section 24.2 for one- and two-family dwellings. For the purpose of application of the requirements of Chapter 24, the terms *guest room* and *guest suite* shall be synonymous with the terms *dwelling* or *living unit*.

29.2.2 Means of Egress Components.

29.2.2.1 General.

29.2.2.1.1 Components of means of egress shall be limited to the types described in 29.2.2.2 through 29.2.2.12.

29.2.2.1.2 In buildings protected throughout by an approved automatic sprinkler system in accordance with 29.3.5, exit enclosures shall have a fire resistance rating of not less than 1 hour, and the fire protection rating of doors shall be not less than 1 hour.

29.2.2.2 Doors.

29.2.2.2.1 Doors complying with 7.2.1 shall be permitted.

29.2.2.2.2 No door in any means of egress shall be locked against egress when the building is occupied.

Exception No. 1: Delayed-egress locks complying with 7.2.1.6.1 shall be permitted, provided that not more than one such device is located in any one egress path.

Exception No. 2: Access-controlled egress doors complying with 7.2.1.6.2 shall be permitted.

29.2.2.2.3 Revolving doors complying with 7.2.1.10 shall be permitted.

29.2.2.2.4 Horizontal sliding doors, as permitted by 7.2.1.14, shall not be used across corridors.

29.2.2.3 Stairs. Stairs complying with 7.2.2 shall be permitted.

29.2.2.4 Smokeproof Enclosures. Smokeproof enclosures complying with 7.2.3 shall be permitted.

29.2.2.5 Horizontal Exits. Horizontal exits complying with 7.2.4 shall be permitted.

29.2.2.6 Ramps. Ramps complying with 7.2.5 shall be permitted.

29.2.2.7 Exit Passageways. Exit passageways complying with 7.2.6 shall be permitted.

29.2.2.8* Escalators. Escalators previously approved as a component in a means of egress shall be permitted to continue to be considered in compliance.

29.2.2.9 Fire Escape Stairs. Fire escape stairs complying with 7.2.8 shall be permitted.

29.2.2.10 Fire Escape Ladders. Fire escape ladders complying with 7.2.9 shall be permitted.

29.2.2.11 Alternating Tread Devices. Alternating tread devices complying with 7.2.11 shall be permitted.

29.2.2.12* Areas of Refuge. Areas of refuge complying with 7.2.12 shall be permitted.

Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 29.3.5, the two accessible rooms or spaces separated from each other by smoke-resistive partitions in accordance with the definition of area of refuge in 3.3.14 shall not be required.

29.2.3 Capacity of Means of Egress.

29.2.3.1 The capacity of means of egress shall be in accordance with Section 7.3.

29.2.3.2 Street floor exits shall be sufficient for the occupant load of the street floor plus the required capacity of stairs and ramps discharging onto the street floor.

29.2.4 Number of Exits. Not less than two exits shall be accessible from every floor, including floors below the level of exit discharge and floors occupied for public purposes.

Exception: Buildings of four stories or less protected throughout by an approved, supervised automatic sprinkler system in accordance with 29.3.5, with not more than four guest rooms or guest suites per floor, shall be permitted to have a single exit under the following conditions:

(a) *The stairway is completely enclosed or separated by barriers having a fire resistance rating of not less than 1 hour with self-closing 1-hour fire protection-rated doors protecting all openings between the stairway enclosure and the building.*

(b) *The stairway does not serve more than one-half of a story below the level of exit discharge.*

(c) *All corridors serving as access to exits have not less than a 1-hour fire resistance rating.*

(d) *The travel distance from the entrance door of any guest room or guest suite to an exit does not exceed 35 ft (10.7 m).*

(e) *Horizontal and vertical separation with a fire rating of not less than 1/2 hour is provided between guest rooms or guest suites.*

29.2.5 Arrangement of Means of Egress.

29.2.5.1 Access to all required exits shall be in accordance with Section 7.5.

29.2.5.2 Common paths of travel shall not exceed 35 ft (10.7 m). Travel within a guest room or guest suite shall not be included when calculating common path of travel.

Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 29.3.5, common path of travel shall not exceed 50 ft (15 m).

29.2.5.3 Dead-end corridors shall not exceed 50 ft (15 m).

29.2.6 Travel Distance to Exits.

29.2.6.1 Travel distance within a guest room or guest suite to a corridor door shall not exceed 75 ft (23 m).

Exception: A travel distance not exceeding 125 ft (38 m) shall be permitted in buildings protected by an approved automatic sprinkler system in accordance with 29.3.5.

29.2.6.2 Travel distance from the corridor door of any guest room or guest suite to the nearest exit, measured in accordance with Section 7.6, shall not exceed 100 ft (30 m).

Exception No. 1: The permitted travel distance to exits shall not exceed 200 ft (60 m) for exterior ways of exit access arranged in accordance with 7.5.3.

Exception No. 2: The permitted travel distance to exits shall not exceed 200 ft (60 m) where the exit access and any portion of the building that is tributary to the exit access are protected throughout by an approved automatic sprinkler system in accordance with 29.3.5. In addition, the portion of the building in which the 200-ft (60-m) travel distance is permitted shall be separated from the remainder of the building by construction having a fire resistance rating of not less than 1 hour, for buildings not more than three stories in height, and 2 hours, for buildings more than three stories in height.

29.2.7 Discharge from Exits.

29.2.7.1 Exit discharge shall comply with Section 7.7.

29.2.7.2* Any required exit stair that is located so that it is necessary to pass through the lobby or other open space to reach the outside of the building shall be continuously enclosed down to a level of exit discharge or to a mezzanine within a lobby at a level of exit discharge.

29.2.7.3 The distance of travel from the termination of the exit enclosure to an exterior door leading to a public way shall not exceed 150 ft (45 m) in buildings protected throughout by an approved automatic sprinkler system in accordance with 29.3.5 and shall not exceed 100 ft (30 m) in all other buildings.

29.2.8 Illumination of Means of Egress. Means of egress shall be illuminated in accordance with Section 7.8.

29.2.9 Emergency Lighting. Emergency lighting in accordance with Section 7.9 shall be provided in all buildings with more than 25 rooms.

Exception: Where each guest room or guest suite has an exit direct to the outside of the building at street or ground level.

29.2.10 Marking of Means of Egress. Means of egress shall have signs in accordance with Section 7.10.

29.2.11 Special Means of Egress Features. (Reserved.)

SECTION 29.3 PROTECTION

29.3.1 Protection of Vertical Openings.

29.3.1.1 Any vertical opening shall be enclosed or protected in accordance with 8.2.5.

Exception No. 1: Openings in accordance with 8.2.5.8 shall be permitted.

Exception No. 2: In buildings protected throughout by an approved automatic sprinkler system in accordance with 29.3.5, and in which exits and required ways of travel thereto are adequately safeguarded against fire and smoke within the building, or where every individual room has direct access to an exterior exit without passing through any public corridor, the protection of vertical openings that are not part of required exits shall not be required where approved by the authority having jurisdiction. The exemption shall be permitted only where such openings do not endanger required means of egress.

Exception No. 3: In buildings not more than two stories in height, unprotected openings shall be permitted by the authority having jurisdiction to continue to be used where the building is protected throughout by an approved automatic sprinkler system in accordance with 29.3.5.

29.3.1.2 No floor below the level of exit discharge used only for storage, heating equipment, or purposes other than residential occupancy shall have unprotected openings to floors used for residential purposes.

29.3.2 Protection from Hazards.

29.3.2.1 Any room containing high pressure boilers, refrigerating machinery, transformers, or other service equipment subject to possible explosion shall not be located directly under or directly adjacent to exits. All such rooms shall be effectively cut off from other parts of the building as specified in Section 8.4.

29.3.2.2 Hazardous Areas. Any hazardous area shall be protected in accordance with Section 8.4. The areas described in Table 29.3.2.2 shall be protected as indicated. Where sprinkler protection without fire-rated separation is used, areas shall be separated from other spaces by smoke partitions complying with 8.2.4.

Table 29.3.2.2 Hazardous Area Protection

Hazardous Area Description	Separation/Protection
Boiler and fuel-fired heater rooms serving more than a single guest room or guest suite	1 hour or sprinklers
Employee locker rooms	1 hour or sprinklers
Gift or retail shops >100 ft ² (>9.3m ²)	1 hour or sprinklers [†]
Bulk laundries	1 hour or sprinklers
Guest laundries >100 ft ² (>9.3m ²) outside of guest rooms or guest suites	1 hour or sprinklers [†]
Maintenance shops	1 hour and sprinklers
Rooms or spaces used for storage of combustible supplies and equipment in quantities deemed hazardous by the authority having jurisdiction [‡]	1 hour or sprinklers
Trash collection rooms	1 hour and sprinklers

[†]Where automatic sprinkler protection is provided, no enclosure shall be required.
[‡]Where storage areas not exceeding 24 ft² (2.2 m²) are directly accessible from the guest room or guest suite, no separation or protection shall be required.

29.3.3 Interior Finish.

29.3.3.1 Interior finish shall be in accordance with Section 10.2.

29.3.3.2 Interior Wall and Ceiling Finish. Interior wall and ceiling finish materials complying with 10.2.3 shall be permitted as follows:

- (1) Exit enclosures — Class A or Class B
- (2) Lobbies and corridors that are part of an exit access — Class A or Class B
- (3) Other spaces — Class A, Class B, or Class C

29.3.3.3 Interior Floor Finish. Interior floor finish in accordance with 10.2.7 shall be in accordance with Table 29.3.3.3.

Exception: Previously installed and approved floor covering.

Table 29.3.3.3 Interior Floor Finish

Location	Sprinklered	Nonsprinklered
Corridors	No requirement	Class II
Exits	No requirement	Class II

29.3.3.4* Furnishings and Decorations. New draperies, curtains, and other similar loosely hanging furnishings and decorations in hotels and dormitories shall be in accordance with the provisions of 10.3.1.

29.3.4 Detection, Alarm, and Communications Systems.

29.3.4.1 General. A fire alarm system in accordance with Section 9.6, except as modified by 29.3.4.2 through 29.3.4.5, shall be provided.

Exception: Buildings where each guest room has exterior exit access in accordance with 7.5.3, and the building does not exceed three stories in height.

29.3.4.2 Initiation. The required fire alarm system shall be initiated by the following:

- (1) Manual means in accordance with 9.6.2
Exception: Manual means as specified in 9.6.2, other than as required by 29.3.4.2(2), shall not be required where there are other effective means to activate the fire alarm system, such as complete automatic sprinkler or automatic detection systems.
- (2) A manual fire alarm box located at the hotel desk or other convenient central control point under continuous supervision by responsible employees
- (3) Any required automatic sprinkler system
- (4) Any required automatic detection system

Exception: The requirements of 29.3.4.2(4) shall not apply to sleeping room smoke detectors.

29.3.4.3 Notification.

29.3.4.3.1 Occupant notification shall be provided automatically in accordance with 9.6.3. Positive alarm sequence in accordance with 9.6.3.4 shall be permitted. A presignal system in accordance with 9.6.3.3 shall be permitted.

29.3.4.3.2* Provisions shall be made for the immediate notification of the public fire department by telephone or other means in case of fire. Where there is no public fire department, notification shall be made to the private fire brigade.

29.3.4.4 Detection. (Reserved.)

29.3.4.5* Smoke Alarms. An approved single-station smoke alarm shall be installed in accordance with 9.6.2.10 in every guest room and every living area and sleeping room within a guest suite. These alarms shall not be required to be interconnected. Single-station smoke alarms without a secondary (standby) power source shall be permitted.

29.3.5 Extinguishment Requirements.

29.3.5.1* Where an automatic sprinkler system is installed, either for total or partial building coverage, the system shall be in accordance with Section 9.7. In buildings up to and including four stories in height, systems in accordance with NFPA 13R, *Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height*, shall be permitted.

Exception No. 1: The provisions for draft stops and closely spaced sprinklers in NFPA 13, Standard for the Installation of Sprinkler Systems, shall not be required for openings complying with 8.2.5.8 where the opening is within the guest room or guest suite.

Exception No. 2: In guest rooms and in guest room suites, sprinkler installations shall not be required in closets not exceeding 24 ft² (2.2 m²) and in bathrooms not exceeding 55 ft² (5.1 m²).

29.3.5.2 All high-rise buildings shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with 29.3.5.1.

Exception: Where each guest room or guest suite has exterior exit access in accordance with 7.5.3.

29.3.5.3 (Reserved.)

29.3.5.4 (Reserved.)

29.3.5.5 Portable fire extinguishers shall be provided as specified in 9.7.4.1 in hazardous areas addressed by 29.3.2.2.

Exception: In buildings protected throughout with an approved automatic sprinkler system in accordance with Section 9.7.

29.3.6 Corridors.

29.3.6.1 Walls. Exit access corridor walls shall consist of fire barriers in accordance with 8.2.3 that have not less than a $1/2$ -hour fire resistance rating.

Exception: In buildings protected throughout by an approved automatic sprinkler system in accordance with 29.3.5, no fire resistance rating shall be required, but the walls and all openings therein shall resist the passage of smoke.

29.3.6.2 Doors. Doors that open onto exit access corridors shall have not less than a 20-minute fire protection rating in accordance with 8.2.3.2.

Exception No. 1: Doors complying with 8.2.3.2.3.

Exception No. 2: Where automatic sprinkler protection is provided in the corridor in accordance with 31.3.5.2 through 31.3.5.4, doors shall not be required to have a fire protection rating but shall resist the passage of smoke. Doors shall be equipped with latches to keep doors tightly closed.

29.3.6.3 Doors that open onto exit access corridors shall be self-closing and self-latching.

29.3.6.4 Unprotected openings shall be prohibited in exit access corridor walls and doors.

Exception: Such spaces shall be permitted to be unlimited in area and open to the corridor, provided that the following criteria are met:

(a) *The spaces are not used for guest rooms or guest suites or hazardous areas.*

(b) *The space is protected by an approved automatic sprinkler system in accordance with 29.3.5.*

(c) *The space does not obstruct access to required exits.*

29.3.6.5 Transoms, louvers, or transfer grilles shall be prohibited in walls or doors of exit access corridors.

Exception No. 1: Existing transoms shall be permitted but shall be fixed in the closed position and shall be covered or otherwise protected to provide a fire resistance rating not less than that of the wall in which they are installed.

Exception No. 2: This requirement shall not apply where a corridor smoke detection system is provided that, when sensing smoke, sounds the building alarm and shuts down return or exhaust fans that draw air into the corridor from the guest rooms. The transfer grille or louver shall be located in the lower one-third of the wall or door height.

Exception No. 3: This requirement shall not apply to buildings protected throughout by an approved automatic sprinkler system complying with 29.3.5 or buildings with corridor sprinkler protection in accordance with 31.3.5.2 through 31.3.5.4. The transfer grille or louver shall be located in the lower one-third of the wall or door height.

29.3.7 Subdivision of Building Spaces. Every guest room floor shall be divided into not less than two smoke compartments of approximately the same size by smoke barriers in accordance with Section 8.3. Smoke dampers shall not be required.

Additional smoke barriers shall be provided so that the travel distance from a guest room corridor door to a smoke barrier shall not exceed 150 ft (45 m).

Exception No. 1: Buildings protected throughout by an approved automatic sprinkler system in accordance with 29.3.5 or a corridor sprinkler system conforming to 31.3.5.2 through 31.3.5.4.

Exception No. 2: Smoke barriers shall not be required where each guest room is provided with exterior ways of exit access arranged in accordance with 7.5.3.

Exception No. 3: Smoke barriers shall not be required where the aggregate corridor length on each floor is not more than 150 ft (45 m).

29.3.8 Special Protection Features. (Reserved.)

SECTION 29.4 SPECIAL PROVISIONS

29.4.1 High-Rise Buildings. High-rise buildings shall comply with 29.3.5.2.

SECTION 29.5 BUILDING SERVICES

29.5.1 Utilities. Utilities shall comply with the provisions of Section 9.1.

29.5.2 Heating, Ventilating, and Air Conditioning.

29.5.2.1 Heating, ventilating, and air conditioning equipment shall comply with the provisions of Section 9.2, except as otherwise required in this chapter.

29.5.2.2 Unvented fuel-fired heaters shall not be used.

Exception: Gas space heaters in compliance with NFPA 54, National Fuel Gas Code.

29.5.3 Elevators, Escalators, and Conveyors. Elevators, escalators, and conveyors shall comply with the provisions of Section 9.4.

29.5.4 Rubbish Chutes, Incinerators, and Laundry Chutes. Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 9.5.

SECTION 29.6 RESERVED

SECTION 29.7 OPERATING FEATURES

29.7.1 Hotel Emergency Organization.

29.7.1.1* Employees of hotels shall be instructed and drilled in the duties they are to perform in the event of fire, panic, or other emergency.

29.7.1.2* Drills of the emergency organization shall be held at quarterly intervals and shall cover such points as the operation and maintenance of the available first aid fire appliances, the testing of devices to alert guests, and a study of instructions for emergency duties.

29.7.2 Emergency Duties. Upon discovery of a fire, employees shall carry out the following duties:

- (1) Activate the facility fire protection signaling system, if provided
- (2) Notify the public fire department
- (3) Take other action as previously instructed

29.7.3 Drills in Dormitories. Emergency egress and relocation drills shall be regularly conducted in accordance with Section 4.7.

29.7.4 Emergency Instructions for Residents or Guests.

29.7.4.1* A floor diagram reflecting the actual floor arrangement, exit locations, and room identification shall be posted in a location and manner acceptable to the authority having jurisdiction on, or immediately adjacent to, every guest room door in hotels and in every resident room in dormitories.

29.7.4.2* Fire safety information shall be provided to allow guests to make the decision to evacuate to the outside, to evacuate to an area of refuge, to remain in place, or to employ any combination of the three options.

Chapter 30 NEW APARTMENT BUILDINGS

SECTION 30.1 GENERAL REQUIREMENTS

30.1.1 Application.

30.1.1.1 The requirements of this chapter apply to the following:

- (1) New buildings or portions thereof used as apartment occupancies (*see 1.4.1*)
- (2) Additions made to, or used as, an apartment occupancy (*see 4.6.6*)
- (3) Alterations, modernizations, or renovations of existing apartment occupancies (*see 4.6.7*)
- (4) Buildings or portions thereof upon change of occupancy to an apartment occupancy (*see 4.6.11*)

30.1.1.2 The term *apartment building*, wherever used in this Code, shall include an apartment house, tenement, garden apartment, or any other structure meeting the definition of *apartment building*.

30.1.2 Mixed Occupancies.

30.1.2.1 Where another type of occupancy exists in the same building as a residential occupancy, the requirements of 6.1.14 of this Code shall apply.

30.1.2.2 No dwelling unit of a residential occupancy shall have its sole means of egress pass through any nonresidential occupancy in the same building.

30.1.2.3 No multiple-dwelling unit of a residential occupancy shall be located above any nonresidential occupancy.

Exception No. 1: Where the dwelling unit of the residential occupancy and exits therefrom are separated from the nonresidential occupancy by construction having a fire resistance rating of not less than 1 hour.

Exception No. 2: Where the nonresidential occupancy is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

30.1.3 Definitions. Terms applicable to this chapter are defined in Chapter 3 of this Code; where necessary, other terms are defined in the text.

Apartment Building. See 3.3.12.

30.1.4 Classification of Occupancy. (*See 30.1.3.*)

30.1.5 Classification of Hazard of Contents. The contents of residential occupancies shall be classified as ordinary hazard in accordance with 6.2.2.

30.1.6 Minimum Construction Requirements. (No special requirements.)

30.1.7 Occupant Load. The occupant load, in number of persons for whom means of egress and other provisions are required, shall be determined on the basis of the occupant load factors of Table 7.3.1.2 that are characteristic of the use of the space or shall be determined as the maximum probable population of the space under consideration, whichever is greater.

SECTION 30.2 MEANS OF EGRESS REQUIREMENTS

30.2.1 General. Means of egress from dwelling units to the outside of the building shall be in accordance with Chapter 7 and this chapter. Means of escape within the dwelling unit shall comply with the provisions of Section 24.2 for one- and two-family dwellings.

30.2.2 Means of Egress Components.

30.2.2.1 General.

30.2.2.1.1 Components of means of egress shall be limited to the types described in 30.2.2.2 through 30.2.2.12.

30.2.2.1.2 In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 30.3.5, exit enclosures shall have a fire resistance rating of not less than 1 hour, and doors shall have a fire protection rating of not less than 1 hour.

30.2.2.2 Doors.

30.2.2.2.1 Doors complying with 7.2.1 shall be permitted.

30.2.2.2.2* No door in any means of egress shall be locked against egress when the building is occupied.

Exception No. 1: Delayed-egress locks complying with 7.2.1.6.1 shall be permitted, provided that not more than one such device is located in any one egress path.

Exception No. 2: Access-controlled egress doors complying with 7.2.1.6.2 shall be permitted.

30.2.2.2.3 Revolving doors complying with 7.2.1.10 shall be permitted.

30.2.2.2.4 Horizontal sliding doors, as permitted by 7.2.1.14, shall not be used across corridors.

30.2.2.3 Stairs.

30.2.2.3.1 Stairs complying with 7.2.2 shall be permitted.

30.2.2.3.2 Within any individual dwelling unit, stairs more than one story above or below the entrance floor level of the dwelling unit shall not be permitted.

30.2.2.3.3 Spiral stairs complying with 7.2.2.2.3 shall be permitted within a single dwelling unit.

30.2.2.3.4 Winders complying with 7.2.2.2.4 shall be permitted within a single dwelling unit.

30.2.2.4 Smokeproof Enclosures. Smokeproof enclosures complying with 7.2.3 shall be permitted.

30.2.2.5 Horizontal Exits. Horizontal exits complying with 7.2.4 shall be permitted.

30.2.2.6 Ramps. Ramps complying with 7.2.5 shall be permitted.

30.2.2.7 Exit Passageways. Exit passageways complying with 7.2.6 shall be permitted.

30.2.2.8 (Reserved.)

30.2.2.9 (Reserved.)

30.2.2.10 Fire Escape Ladders. Fire escape ladders complying with 7.2.9 shall be permitted.

30.2.2.11 Alternating Tread Devices. Alternating tread devices complying with 7.2.11 shall be permitted.

30.2.2.12* Areas of Refuge. Areas of refuge complying with 7.2.12 shall be permitted.

Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 30.3.5, the two accessible rooms or spaces separated from each other by smoke-resistive partitions in accordance with the definition of area of refuge in 3.3.14 shall not be required.

30.2.3 Capacity of Means of Egress.

30.2.3.1 The capacity of means of egress shall be in accordance with Section 7.3.

30.2.3.2 Street floor exits shall be sufficient for the occupant load of the street floor plus the required capacity of stairs and ramps discharging onto the street floor.

30.2.3.3 The corridor width shall be sufficient to accommodate the required occupant load, but shall be not less than 44 in. (112 cm).

Exception: Corridors with a required capacity not exceeding 50 persons as defined in Section 7.3 shall be not less than 36 in. (91 cm) in width.

30.2.4 Number of Exits. Every dwelling unit shall have access to not less than two separate exits remotely located from each other as required by 7.5.1. (See also Section 7.4.)

Exception No. 1: Any dwelling unit shall be permitted to have a single exit, provided that one of the following criteria is met:

(a) *The dwelling unit has an exit door opening directly to the street or yard at ground level.*

(b) *The dwelling unit has direct access to an outside stair complying with 7.2.2 that serves not more than two units, both of which are located on the same floor.*

(c) *The dwelling unit has direct access to an interior stair serving only that unit, and such stair is separated from all other portions of the building by fire barriers having not less than a 1-hour fire resistance rating with no opening therein.*

Exception No. 2: Buildings of four stories or less protected throughout by an approved, supervised automatic sprinkler system in accordance with 30.3.5, with not more than four dwelling units per story, shall be permitted to have a single exit under the following conditions:

(a) *The stairway is separated from the rest of the building by barriers having not less than a 1-hour fire resistance rating, with self-closing doors having not less than a 1-hour fire protection rating protecting all openings between the stairway enclosure and the building.*

(b) *The stairway does not serve more than one-half of a story below the level of exit discharge.*

(c) *All corridors serving as access to exits have not less than a 1-hour fire resistance rating.*

(d) *The travel distance from the entrance door of any dwelling unit to an exit does not exceed 35 ft (10.7 m).*

(e) *Horizontal and vertical separation with a fire rating of not less than 1/2 hour is provided between dwelling units.*

30.2.5 Arrangement of Means of Egress.

30.2.5.1 Access to all required exits shall be in accordance with Section 7.5.

Exception: The distance between exits addressed by 7.5.1.4 shall not apply to nonlooped exit access corridors in buildings that have corridor doors from the dwelling units that are arranged such that the exits are located in opposite directions from such doors.

30.2.5.2 Common paths of travel shall not exceed 35 ft (10.7 m). Travel within a dwelling unit shall not be included when calculating common path of travel.

Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 30.3.5, common path of travel shall not exceed 50 ft (15 m).

30.2.5.3 Dead-end corridors shall not exceed 35 ft (10.7 m).

Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 30.3.5, dead-end corridors shall not exceed 50 ft (15 m).

30.2.6 Travel Distance to Exits.

30.2.6.1 Travel distance within a dwelling unit (apartment) to a corridor door shall not exceed 75 ft (23 m).

Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 30.3.5, the travel distance shall not exceed 125 ft (38 m).

30.2.6.2 The travel distance from a dwelling unit (apartment) entrance door to the nearest exit shall not exceed 100 ft (30 m).

Exception No. 1: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 30.3.5, the travel distance shall not exceed 200 ft (60 m).

Exception No. 2: Travel distance to exits shall not exceed 200 ft (60 m) for exterior ways of exit access arranged in accordance with 7.5.3.

30.2.6.3 The travel distance from areas other than those within living units to the exit, measured in accordance with Section 9.6, shall not exceed 200 ft (67 m).

Exception: Travel distance shall not exceed 250 ft (83 m) in buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

30.2.7 Discharge from Exits. Exit discharge shall comply with Section 7.7.

30.2.8 Illumination of Means of Egress. Means of egress shall be illuminated in accordance with Section 7.8.

30.2.9 Emergency Lighting. Emergency lighting in accordance with Section 7.9 shall be provided in all buildings with more than 12 dwelling units or more than three stories in height.

Exception: Where every dwelling unit has a direct exit to the outside of the building at grade level.

30.2.10 Marking of Means of Egress. Means of egress shall have signs in accordance with Section 7.10 in all buildings requiring more than one exit.

30.2.11 Special Means of Egress Features. (Reserved.)

SECTION 30.3 PROTECTION

30.3.1 Protection of Vertical Openings.

30.3.1.1 Any vertical opening shall be enclosed or protected in accordance with 8.2.5. Where the provisions of 8.2.5.5 are used, the requirements of 30.3.5.5 shall be met.

Exception No. 1: Openings in accordance with 8.2.5.8 shall be permitted.

Exception No. 2: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 30.3.5, the fire resistance of walls shall be not less than 1 hour, and the fire protection rating of doors shall be not less than 1 hour.

30.3.1.2 No floor below the level of exit discharge used only for storage, heating equipment, or purposes other than residential occupancy open to the public shall have unprotected openings to floors used for residential purposes.

30.3.1.3 No unenclosed vertical opening shall be permitted in any building or fire section with only one exit.

30.3.2 Protection from Hazards.

30.3.2.1 Hazardous Areas. Any hazardous area shall be protected in accordance with Section 8.4. The areas described in Table 30.3.2.1 shall be protected as indicated. Where sprinkler protection without fire-rated separation is used, areas shall be separated from other spaces by smoke partitions complying with 8.2.4.

Table 30.3.2.1 Hazardous Area Protection

Hazardous Area Description	Separation/Protection
Boiler and fuel-fired heater rooms serving more than a single dwelling unit	1 hour and sprinklers
Employee locker rooms	1 hour or sprinklers
Gift or retail shops	1 hour or sprinklers
Bulk laundries	1 hour and sprinklers
Laundries ≤ 100 ft ² (≤ 9.3 m ²) outside of dwelling units	1 hour or sprinklers [†]
Laundries > 100 ft ² (> 9.3 m ²) outside of dwelling units	1 hour and sprinklers
Maintenance shops	1 hour and sprinklers
Storage rooms outside of dwelling units	1 hour or sprinklers
Trash collection rooms	1 hour and sprinklers

[†]Where sprinklers are provided, separation shall not be required.

30.3.3 Interior Finish.

30.3.3.1 Interior finish shall be in accordance with Section 10.2.

30.3.3.2 Interior Wall and Ceiling Finish. Interior wall and ceiling finish materials complying with 10.2.3 shall be permitted as follows:

- (1) Exit enclosures — Class A
- (2) Lobbies and corridors — Class A or Class B
- (3) Other spaces — Class A, Class B, or Class C

30.3.3.3 Interior Floor Finish. Interior floor finish in accordance with 10.2.7 shall be in accordance with Table 30.3.3.3.

Table 30.3.3.3 Interior Floor Finish

Location	Sprinklered	Nonsprinklered
Corridors	No requirement	Class II
Exits	No requirement	Class II

30.3.4 Detection, Alarm, and Communications Systems.

30.3.4.1 General. Apartment buildings with more than three stories or with more than 11 dwelling units shall be provided with a fire alarm system in accordance with Section 9.6, except as modified by 30.3.4.2 through 30.3.4.5.

Exception No. 1: Where each dwelling unit is separated from other contiguous dwelling units by fire barriers (see 8.2.3) having a fire resistance rating of not less than 1 hour, and where each dwelling unit

has either its own independent exit or its own independent stairway or ramp discharging at grade.

Exception No. 2: Buildings that are protected throughout by an approved, automatic sprinkler system in accordance with 30.3.5.1, that do not exceed four stories in height, and that contain not more than 16 dwelling units.

30.3.4.2 Initiation.

30.3.4.2.1 Initiation of the required fire alarm system shall be by manual means in accordance with 9.6.2.

Exception: Buildings that are protected throughout by an approved, supervised automatic sprinkler system in accordance with 30.3.5.1, that do not exceed four stories in height, and that contain not more than 16 dwelling units.

30.3.4.2.2 In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 30.3.5, required fire alarm systems shall be initiated upon operation of the automatic sprinkler system.

30.3.4.3 Notification.

30.3.4.3.1 Occupant notification shall be provided automatically in accordance with Section 9.6. Visible signals shall be installed in units designed for the hearing impaired. Positive alarm sequence in accordance with 9.6.3.4 shall be permitted.

30.3.4.3.2 Annunciation in accordance with 9.6.7 shall be provided.

Exception No. 1: Buildings not more than two stories in height and having not more than 50 dwelling units.

Exception No. 2: Buildings that are protected throughout by an approved, supervised automatic sprinkler system in accordance with 30.3.5.1, that do not exceed four stories in height, and that contain not more than 16 dwelling units.

30.3.4.4 Detection. (Reserved.)

30.3.4.5 Smoke Alarms.

30.3.4.5.1* Approved single-station smoke alarms shall be installed in accordance with 9.6.2.10 outside every sleeping area in the immediate vicinity of the bedrooms and on all levels of the dwelling unit, including basements.

30.3.4.5.2 Approved single-station smoke alarms shall be installed in accordance with 9.6.2.10 in every sleeping room.

Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 30.3.5.

30.3.5 Extinguishment Requirements.

30.3.5.1 Where an automatic sprinkler system is installed, either for total or partial building coverage, the system shall be in accordance with Section 9.7. In buildings up to and including four stories in height, systems in accordance with NFPA 13R, *Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height*, shall be permitted.

Exception No. 1: In buildings sprinklered in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems, closets less than 12 ft² (1.1 m²) in area in individual dwelling units shall not be required to be sprinklered. Closets that contain equipment such as washers, dryers, furnaces, or water heaters shall be sprinklered regardless of size.

Exception No. 2: The provisions for draft stops and closely spaced sprinklers in NFPA 13, Standard for the Installation of Sprinkler Sys-

tems, shall not be required for openings complying with 8.2.5.8 where the opening is within the dwelling unit.

30.3.5.2 All buildings shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with 30.3.5.1.

Exception: Buildings where every dwelling unit is provided with one of the following:

(a) An exit door opening directly to the street or yard at ground level

(b) Direct access to an outside stair complying with 7.2.2 that serves not more than two units, both of which are located on the same floor

(c) Direct access to an interior stair serving only that unit, and such stair is separated from all other portions of the building by fire barriers having a 1-hour fire resistance rating with no openings therein

30.3.5.3 Listed quick-response or listed residential sprinklers shall be used throughout all dwelling units.

30.3.5.4 Open parking structures complying with NFPA 88A, *Standard for Parking Structures*, that are contiguous with apartment buildings shall be exempt from the sprinkler requirements of 30.3.5.2.

30.3.5.5 Buildings with unprotected openings in accordance with 8.2.5.5 shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with 30.3.5.

30.3.5.6 (Reserved.)

30.3.5.7 Portable fire extinguishers in accordance with 9.7.4.1 shall be provided in hazardous areas addressed by 30.3.2.1.

Exception: In buildings protected throughout with an approved, supervised automatic sprinkler system in accordance with Section 9.7.

30.3.6 Corridors.

30.3.6.1 Walls. Exit access corridor walls shall consist of fire barriers in accordance with 8.2.3 that have not less than a 1-hour fire resistance rating.

Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 30.3.5, corridor walls shall have not less than a 1/2-hour fire resistance rating.

30.3.6.2 Doors. Doors that open onto exit access corridors shall have not less than a 20-minute fire protection rating in accordance with 8.2.3.2.

30.3.6.3 Doors that open onto exit access corridors shall be self-closing and self-latching.

30.3.6.4 Unprotected openings shall be prohibited in exit access corridor walls and doors.

Exception: Such spaces shall be permitted to be unlimited in area and open to the corridor, provided that the following criteria are met:

(a) The spaces are not used for dwelling units or hazardous areas.

(b) The space is protected by an approved, supervised automatic sprinkler system in accordance with 30.3.5.

(c) The space does not obstruct access to required exits.

30.3.6.5 Transoms, louvers, or transfer grilles shall be prohibited in walls or doors of exit access corridors.

30.3.7 Subdivisions of Building Spaces. (Reserved.)

30.3.8 Special Protection Features. (Reserved.)

SECTION 30.4 SPECIAL PROVISIONS

30.4.1 High-Rise Buildings. High-rise buildings shall comply with Section 11.8. Exception No. 1 and Exception No. 2 to 30.3.5.1 shall be permitted.

SECTION 30.5 BUILDING SERVICES

30.5.1 Utilities. Utilities shall comply with the provisions of Section 9.1.

30.5.2 Heating, Ventilating, and Air Conditioning.

30.5.2.1 Heating, ventilating, and air conditioning equipment shall comply with the provisions of Section 9.2.

30.5.2.2 Unvented fuel-fired heaters shall not be used.

Exception: Gas space heaters in compliance with NFPA 54, National Fuel Gas Code.

30.5.3 Elevators, Escalators, and Conveyors. Elevators, escalators, and conveyors shall comply with the provisions of Section 9.4.

30.5.4 Rubbish Chutes, Incinerators, and Laundry Chutes. Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 9.5.

SECTION 30.6 RESERVED

SECTION 30.7 OPERATING FEATURES

30.7.1 Emergency Instructions for Residents of Apartment Buildings. Emergency instructions shall be provided annually to each dwelling unit to indicate the location of alarms, egress paths, and actions to be taken, both in response to a fire in the dwelling unit and in response to the sounding of the alarm system.

Chapter 31 EXISTING APARTMENT BUILDINGS

SECTION 31.1* GENERAL REQUIREMENTS

31.1.1 Application.

31.1.1.1 The requirements of this chapter apply to existing buildings or portions thereof currently occupied as apartment occupancies (*see also 30.1.1*). In addition, the building shall meet the requirements of one of the following options:

- (1) Option 1 — Buildings without fire suppression or detection systems
- (2) Option 2 — Buildings provided with a complete automatic fire detection and notification system
- (3) Option 3 — Buildings provided with automatic sprinkler protection in selected areas
- (4) Option 4 — Buildings protected throughout by an approved automatic sprinkler system

31.1.1.2 The term *apartment building*, wherever used in this Code, shall include an apartment house, tenement, garden apartment, or any other structure meeting the definition of *apartment building*.

31.1.2 Mixed Occupancies.

31.1.2.1 Where another type of occupancy exists in the same building as a residential occupancy, the requirements of 6.1.14 of this Code shall apply.

31.1.2.2 No dwelling unit of a residential occupancy shall have its sole means of egress pass through any nonresidential occupancy in the same building.

31.1.2.3 No multiple-dwelling unit of a residential occupancy shall be located above any nonresidential occupancy.

Exception No. 1: Where the dwelling unit of the residential occupancy and exits therefrom are separated from the nonresidential occupancy by construction having a fire resistance rating of not less than 1 hour.

Exception No. 2: Where the nonresidential occupancy is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

Exception No. 3: A building with not more than two dwelling units above a nonresidential occupancy shall be permitted, provided that the nonresidential occupancy is protected by an automatic fire detection system in accordance with Section 9.6.

31.1.3 Definitions. Terms applicable to this chapter are defined in Chapter 3 of this Code; where necessary, other terms are defined in the text.

Apartment Building. See 3.3.12.

31.1.4 Classification of Occupancy. (*See 31.1.3.*)

31.1.5 Classification of Hazard of Contents. The contents of residential occupancies shall be classified as ordinary hazard in accordance with 6.2.2.

31.1.6 Minimum Construction Requirements. (No special requirements.)

31.1.7 Occupant Load. The occupant load, in number of persons for whom means of egress and other provisions are required, shall be determined on the basis of the occupant load factors of Table 7.3.1.2 that are characteristic of the use of the space or shall be determined as the maximum probable population of the space under consideration, whichever is greater.

SECTION 31.2 MEANS OF EGRESS REQUIREMENTS

31.2.1 General. Means of egress from dwelling units to the outside of the building shall be in accordance with Chapter 7 and this chapter. Means of escape within the dwelling unit shall comply with the provisions of Section 24.2 for one- and two-family dwellings.

31.2.2 Means of Egress Components.

31.2.2.1 General.

31.2.2.1.1 Components of means of egress shall be limited to the types described in 31.2.2.2 through 31.2.2.12.

31.2.2.1.2 In buildings using Option 4, exit enclosures shall have a fire resistance rating of not less than 1 hour, and doors shall have a fire protection rating of not less than 1 hour.

31.2.2.1.3 In non-high-rise buildings using Option 2, Option 3, or Option 4, exit stair doors shall be permitted to be 1³/₄-in. (4.4-cm) thick, solid-bonded wood core doors, self-closing and self-latching, and in wood frames not less than 3/₄ in. (1.9 cm) thick. In buildings using Option 3, sprinklers shall also be provided within the exit enclosure in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*.

31.2.2.2 Doors.

31.2.2.2.1 Doors complying with 7.2.1 shall be permitted.

31.2.2.2.2 No door in any means of egress shall be locked against egress when the building is occupied.

Exception No. 1: Delayed-egress locks complying with 7.2.1.6.1 shall be permitted, provided that not more than one such device is located in any one egress path.

Exception No. 2: Access-controlled egress doors complying with 7.2.1.6.2 shall be permitted.

31.2.2.2.3 Revolving doors complying with 7.2.1.10 shall be permitted.

31.2.2.2.4 Horizontal sliding doors, as permitted by 7.2.1.14, shall not be used across corridors.

31.2.2.3 Stairs.

31.2.2.3.1 Stairs complying with 7.2.2 shall be permitted.

31.2.2.3.2 Within any individual dwelling unit, stairs more than one story above or below the entrance floor level of the dwelling unit shall not be permitted.

31.2.2.3.3 Spiral stairs complying with 7.2.2.2.3 shall be permitted within a single dwelling unit.

31.2.2.3.4 Winders complying with 7.2.2.2.4 shall be permitted.

31.2.2.4 Smokeproof Enclosures. Smokeproof enclosures complying with 7.2.3 shall be permitted. (*See also 31.2.11.*)

31.2.2.5 Horizontal Exits. Horizontal exits complying with 7.2.4 shall be permitted.

31.2.2.6 Ramps. Ramps complying with 7.2.5 shall be permitted.

31.2.2.7 Exit Passageways. Exit passageways complying with 7.2.6 shall be permitted.

31.2.2.8* Escalators. Escalators previously approved as a component in the means of egress shall be permitted to continue to be considered as in compliance.

31.2.2.9 Fire Escape Stairs. Fire escape stairs complying with 7.2.8 shall be permitted.

31.2.2.10 Fire Escape Ladders. Fire escape ladders complying with 7.2.9 shall be permitted.

31.2.2.11 Alternating Tread Devices. Alternating tread devices complying with 7.2.11 shall be permitted.

31.2.2.12* Areas of Refuge. Areas of refuge complying with 7.2.12 shall be permitted.

Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 31.3.5, the two accessible rooms or spaces separated from each other by smoke-resistive partitions in accordance with the definition of area of refuge in 3.3.14 shall not be required.

31.2.3 Capacity of Means of Egress.

31.2.3.1 The capacity of means of egress shall be in accordance with Section 7.3.

31.2.3.2 Street floor exits shall be sufficient for the occupant load of the street floor plus the required capacity of stairs and ramps discharging onto the street floor.

31.2.4 Number of Exits. Every dwelling unit shall have access to not less than two separate exits remotely located from each other as required by 7.5.1. (See also Section 7.4.)

Exception No. 1: Any dwelling unit shall be permitted to have a single exit, provided that one of the following criteria is met:

(a) The dwelling unit has an exit door opening directly to the street or yard at ground level.

(b) The dwelling unit has direct access to an outside stair complying with 7.2.2 that serves not more than two units, both of which are located on the same floor.

(c) The dwelling unit has direct access to an interior stair serving only that unit, and such stair is separated from all other portions of the building by fire barriers having not less than a 1-hour fire resistance rating with no opening therein.

Exception No. 2: Buildings of four stories or less protected throughout by an approved, supervised automatic sprinkler system in accordance with 31.3.5.1 shall be permitted to have a single exit under the following conditions:

(a) The stairway is separated from the rest of the building by barriers having not less than a 1-hour fire resistance rating, with self-closing doors having not less than a 1-hour fire protection rating protecting all openings between the stairway enclosure and the building.

(b) The stairway does not serve more than one-half of a story below the level of exit discharge.

(c) All corridors serving as access to exits have not less than a 1/2-hour fire resistance rating.

(d) The travel distance from the entrance door of any dwelling unit to an exit does not exceed 35 ft (10.7 m).

(e) Horizontal and vertical separation with a fire rating of not less than 1/2 hour is provided between dwelling units.

Exception No. 3: Any building of three stories or less in its entirety shall be permitted to have a single exit under the following conditions:

(a) The stairway is separated from the rest of the building by barriers having not less than a 1-hour fire resistance rating, with self-closing doors having not less than a 1-hour fire protection rating protecting all openings between the stairway enclosure and the building.

(b) The stairway does not serve more than one-half of a story below the level of exit discharge.

(c) All corridors serving as access to exits have not less than a 20-minute fire resistance rating.

(d) The travel distance from the entrance door of any dwelling unit to an exit does not exceed 35 ft (10.7 m).

(e) Horizontal and vertical separation with a fire rating of not less than 1/2 hour is provided between dwelling units.

Exception No. 4: A building of any height, with not more than four dwelling units per floor, with a smokeproof enclosure or outside stair in accordance with the requirements of 7.2.3 as the exit, where such exit is immediately accessible to all dwelling units served thereby, shall be permitted to have a single exit. "Immediately accessible" means that the travel distance from the entrance door of any dwelling unit to an exit shall not exceed 20 ft (6.1 m).

31.2.5 Arrangement of Means of Egress.

31.2.5.1 Access to all required exits shall be in accordance with Section 7.5.

31.2.5.2 Common paths of travel shall not exceed 35 ft (10.7 m). Travel within a dwelling unit shall not be included when calculating common path of travel.

Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 31.3.5, common path of travel shall not exceed 50 ft (15 m).

31.2.5.3 Dead-end corridors shall not exceed 50 ft (15 m).

31.2.6 Travel Distance to Exits.

31.2.6.1 Travel distance within a dwelling unit (apartment) to a corridor door shall not exceed the following limits:

- (1) For buildings using Option 1 or Option 3 — 75 ft (23 m)
- (2) For buildings using Option 2 or Option 4 — 125 ft (38 m)

31.2.6.2 The travel distance from a dwelling unit (apartment) entrance door to the nearest exit shall not exceed the following limits:

- (1) For buildings using Option 1 — 100 ft (30 m)
- (2) For buildings using Option 2 or Option 3 — 150 ft (45 m)
- (3) For buildings using Option 4 — 200 ft (60 m)

Exception: Travel distance to exits shall not exceed 200 ft (60 m) for exterior ways of exit access arranged in accordance with 7.5.3.

31.2.7 Discharge from Exits.

31.2.7.1 Exit discharge shall comply with Section 7.7.

31.2.7.2 Any required exit stair that is located so that it is necessary to pass through the lobby or other open space to reach the outside of the building shall be continuously enclosed to a level of exit discharge or to a mezzanine within a lobby at a level of exit discharge.

31.2.7.3 The distance of travel from the termination of the exit enclosure to an exterior door leading to a public way shall not exceed 150 ft (45 m) in buildings protected throughout by an approved automatic sprinkler system and shall not exceed 100 ft (30 m) in all other buildings.

31.2.8 Illumination of Means of Egress. Means of egress shall be illuminated in accordance with Section 7.8.

31.2.9 Emergency Lighting. Emergency lighting in accordance with Section 7.9 shall be provided in all buildings with more than 12 dwelling units or more than three stories in height.

Exception: Where every dwelling unit has a direct exit to the outside of the building at grade level.

31.2.10 Marking of Means of Egress. Means of egress shall have signs in accordance with Section 7.10 in all buildings requiring more than one exit.

31.2.11* Special Means of Egress Features. In high-rise buildings using Option 1, Option 2, or Option 3, smokeproof enclosures shall be provided in accordance with 7.2.3.

SECTION 31.3 PROTECTION

31.3.1 Protection of Vertical Openings.

31.3.1.1 Any vertical opening shall be enclosed or protected in accordance with 8.2.5.

Exception No. 1: Openings in accordance with 8.2.5.8 shall be permitted.

Exception No. 2: In buildings protected throughout by an approved automatic sprinkler system in accordance with 31.3.5, and in which exits and required ways of travel thereto are adequately safeguarded against fire and smoke within the building, or where every individual room has direct access to an exterior exit without passing through any public corridor, the protection of vertical openings that are not part of required exits shall not be required.

31.3.1.2 No floor below the level of exit discharge used only for storage, heating equipment, or purpose other than residential occupancy open to the public shall have unprotected openings to floors used for residential purposes.

31.3.2 Protection from Hazards.

31.3.2.1 Hazardous Areas. Any hazardous area shall be protected in accordance with Section 8.4. The areas described in Table 31.3.2.1 shall be protected as indicated. Where sprinkler protection without fire-rated separation is used, areas shall be separated from other spaces by smoke partitions complying with 8.2.4.

Table 31.3.2.1 Hazardous Area Protection

Hazardous Area Description	Separation/Protection
Boiler and fuel-fired heater rooms serving more than a single dwelling unit	1 hour or sprinklers
Employee locker rooms	1 hour or sprinklers
Gift or retail shops >100 ft ² (>9.3 m ²)	1 hour or sprinklers [†]
Bulk laundries	1 hour or sprinklers
Laundries >100 ft ² (>9.3 m ²) outside of dwelling units	1 hour or sprinklers [†]
Maintenance shops	1 hour or sprinklers
Rooms or spaces used for storage of combustible supplies and equipment in quantities deemed hazardous by the authority having jurisdiction	1 hour or sprinklers
Trash collection rooms	1 hour or sprinklers

[†]Where sprinklers are provided, separation shall not be required.

31.3.3 Interior Finish.

31.3.3.1 Interior finish shall be in accordance with Section 10.2.

31.3.3.2 Interior Wall and Ceiling Finish. Interior wall and ceiling finish materials complying with 10.2.3 shall be permitted as follows:

- (1) Exit enclosures — Class A or Class B
- (2) Lobbies and corridors — Class A or Class B
- (3) Other spaces — Class A, Class B, or Class C

31.3.3.3 Interior Floor Finish. Interior floor finish in accordance with 10.2.7 shall be in accordance with Table 31.3.3.3.

Exception: Previously installed and approved floor coverings.

Table 31.3.3.3 Interior Floor Finish

Location	Option 3 and Option 4	Option 1 and Option 2
Corridors	No requirement	Class II
Exits	No requirement	Class II

31.3.4 Detection, Alarm, and Communications Systems.

31.3.4.1 General. Apartment buildings with more than three stories or with more than 11 dwelling units shall be provided with a fire alarm system in accordance with Section 9.6, except as modified by 31.3.4.2 through 31.3.4.5.

Exception: Where each dwelling unit is separated from other contiguous dwelling units by fire barriers (see 8.2.3) having a fire resistance rating of not less than 1/2 hour, and where each dwelling unit has either its own independent exit or its own independent stairway or ramp discharging at grade.

31.3.4.2 Initiation.

31.3.4.2.1 Initiation of the required fire alarm system shall be by manual means in accordance with 9.6.2.

Exception: Buildings that are protected throughout by an approved, supervised automatic sprinkler system in accordance with 31.3.5.1, that do not exceed four stories in height, and that contain not more than 16 dwelling units.

31.3.4.2.2 In buildings using Option 2, the required fire alarm system shall be initiated by the automatic fire detection system in addition to the manual initiation means of 31.3.4.2.1.

31.3.4.2.3 In buildings using Option 3, the required fire alarm system shall be initiated upon operation of the automatic sprinkler system in addition to the manual initiation means of 31.3.4.2.1.

31.3.4.2.4 In buildings using Option 4, the required fire alarm system shall be initiated upon operation of the automatic sprinkler system in addition to the manual initiation means of 31.3.4.2.1.

31.3.4.3 Notification.

31.3.4.3.1 Occupant notification shall be provided automatically in accordance with Section 9.6. Visible signals shall be installed in units designed for the hearing impaired. Positive alarm sequence in accordance with 9.6.3.4 shall be permitted. Existing approved presignal systems shall be permitted in accordance with 9.6.3.3.

31.3.4.3.2 An annunciator panel connected with the required fire alarm system shall be provided. The location of

the annunciator panel shall be approved by the authority having jurisdiction.

Exception No. 1: Buildings not more than two stories in height and having not more than 50 dwelling units.

Exception No. 2: Buildings that are protected throughout by an approved, supervised automatic sprinkler system in accordance with 31.3.5.1, that do not exceed four stories in height, and that contain not more than 16 dwelling units.

31.3.4.4 Detection. In buildings using Option 2, a complete automatic fire detection system in accordance with 9.6.1.4 shall be required.

31.3.4.5 Smoke Alarms.

31.3.4.5.1 Approved single-station smoke alarms shall be installed in accordance with 9.6.2.10 outside every sleeping area in the immediate vicinity of the bedrooms and on all levels of the dwelling unit, including basements.

Exception No. 1: The single-station smoke alarm shall not be required where the building is equipped throughout with an existing, complete automatic smoke detection system.

Exception No. 2: Single-station smoke alarms without a secondary (standby) power source shall be permitted.

31.3.5 Extinguishment Requirements.

31.3.5.1* Where an automatic sprinkler system is installed, either for total or partial building coverage, the system shall be in accordance with Section 9.7. In buildings up to and including four stories in height, systems in accordance with NFPA 13R, *Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height*, shall be permitted.

Exception No. 1: In individual dwelling units, sprinkler installation shall not be required in closets not exceeding 24 ft² (2.2 m²) and in bathrooms not exceeding 55 ft² (5.1 m²). Closets that contain equipment such as washers, dryers, furnaces, or water heaters shall be sprinklered regardless of size.

Exception No. 2: The provisions for draft stops and closely spaced sprinklers in NFPA 13, Standard for the Installation of Sprinkler Systems, shall not be required for openings complying with 8.2.5.8 where the opening is within the dwelling unit.

31.3.5.2 Buildings using Option 3 shall be provided with the following:

- (1) Automatic sprinklers in the corridor along the corridor ceiling
- (2) An automatic sprinkler within any dwelling unit that has a door opening to the corridor, with such sprinkler positioned over the center of the door

Exception: The sprinkler inside dwelling units shall not be required if the door to the dwelling unit has not less than a 20-minute fire protection rating and is self-closing.

31.3.5.3 The sprinkler installation required in 31.3.5.2 shall meet the requirements of Section 9.7 in terms of workmanship and materials.

31.3.5.4 The installation of the corridor sprinklers required in 31.3.5.2 shall not exceed the maximum spacing and protection area requirements of the installation standards referenced in Section 9.7.

31.3.5.5 Buildings using Option 4 shall be protected throughout by an approved automatic sprinkler system in accordance

with 31.3.5.1. The automatic sprinkler system shall meet the requirements of Section 9.7 for supervision for buildings more than six stories in height.

31.3.5.6 All high-rise buildings shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with 31.3.5.1.

Exception No. 1: Where every dwelling unit has exterior exit access in accordance with 7.5.3.

Exception No. 2: Buildings in which an engineered life safety system has been approved by the authority having jurisdiction.*

31.3.5.7 Portable fire extinguishers in accordance with 9.7.4.1 shall be provided in hazardous areas addressed by 31.3.2.1.

Exception: In buildings protected throughout with an approved automatic sprinkler system in accordance with Section 9.7.

31.3.6 Corridors.

31.3.6.1* Walls. Exit access corridor walls shall consist of fire barriers in accordance with 8.2.3 that have not less than a 1/2-hour fire resistance rating.

31.3.6.2 Doors. Doors that open onto exit access corridors shall have not less than a 20-minute fire protection rating in accordance with 8.2.3.2.

Exception No. 1: Doors complying with 8.2.3.2.3.

Exception No. 2: In buildings using Option 3 or Option 4, doors shall be constructed to resist the passage of smoke.

31.3.6.3 Doors that open onto exit access corridors shall be self-closing and self-latching.

31.3.6.4 Unprotected openings shall be prohibited in exit access corridor walls and doors.

Exception: Such spaces shall be permitted to be unlimited in area and open to the corridor, provided that the following criteria are met:

- (a) The spaces are not used for dwelling units or hazardous areas.
- (b) The space is protected by an approved automatic sprinkler system in accordance with 31.3.5.
- (c) The space does not obstruct access to required exits.

31.3.6.5 Transoms, louvers, or transfer grilles shall be prohibited in walls or doors of exit access corridors.

31.3.7 Subdivision of Building Spaces — Smoke Barriers. Smoke barriers in accordance with Section 8.3 shall be provided in exit access corridors to establish not less than two compartments approximately equal in size. The length of each smoke compartment, measured along the corridor, shall not exceed 200 ft (60 m). Smoke dampers shall not be required.

Exception No. 1: Buildings using Option 4.

Exception No. 2: Exterior exit access in accordance with 7.5.3 that provides access to two exits.

Exception No. 3: Buildings complying with one of the exceptions to 31.2.4.

Exception No. 4: Buildings with exits not more than 50 ft (15 m) apart.

Exception No. 5: Where each dwelling unit has direct access to the exterior at grade.

31.3.8 Special Protection Features. (Reserved.)

SECTION 31.4 SPECIAL PROVISIONS

31.4.1 High-Rise Buildings. High-rise buildings shall comply with 31.2.11 and 31.3.5.6.

SECTION 31.5 BUILDING SERVICES

31.5.1 Utilities. Utilities shall comply with the provisions of Section 9.1.

31.5.2 Heating, Ventilating, and Air Conditioning.

31.5.2.1 Heating, ventilating, and air conditioning equipment shall comply with the provisions of Section 9.2.

31.5.2.2 Unvented fuel-fired heaters shall not be used.

Exception: Gas space heaters in compliance with NFPA 54, National Fuel Gas Code.

31.5.3 Elevators, Escalators, and Conveyors. Elevators, escalators, and conveyors shall comply with the provisions of Section 9.4.

31.5.4 Rubbish Chutes, Incinerators, and Laundry Chutes. Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 9.5.

SECTION 31.6 RESERVED**SECTION 31.7 OPERATING FEATURES**

31.7.1 Emergency Instructions for Residents of Apartment Buildings. Emergency instructions shall be provided annually to each dwelling unit to indicate the location of alarms, egress paths, and actions to be taken, both in response to a fire in the dwelling unit and in response to the sounding of the alarm system.

Chapter 32 NEW RESIDENTIAL BOARD AND CARE OCCUPANCIES

SECTION 32.1 GENERAL REQUIREMENTS

32.1.1* Application.

32.1.1.1 The requirements of this chapter apply to the following:

- (1) New buildings or portions thereof used as residential board and care occupancies (*see 1.4.1*)
- (2) Additions made to, or used as, residential board and care occupancies (*see 4.6.6*)
- (3) Alterations, modernizations, or renovations of residential board and care occupancies (*see 4.6.7*)
- (4) Buildings or portions thereof upon change of occupancy to a residential board and care occupancy (*see 4.6.11*)

32.1.1.2 This chapter is divided into five sections as follows:

- (1) Section 32.1 — General Requirements
- (2) Section 32.2 — Small Facilities (that is, sleeping accommodations for not more than 16 residents)
- (3) Section 32.3 — Large Facilities (that is, sleeping accommodations for more than 16 residents)
- (4) Section 32.4 — Suitability of an Apartment Building to House a Board and Care Occupancy
- (5) Section 32.7 — Operating Features (*Sections 32.5 and 32.6 are reserved.*)

32.1.1.3 Conversion. For the purposes of this chapter, exceptions for conversions shall apply only for a change of occupancy from an existing residential or health care occupancy to a residential board and care occupancy.

32.1.2 Mixed Occupancies.

32.1.2.1 Where another type of occupancy exists in the same building as a residential board and care occupancy, the requirements of 6.1.14 of this *Code* shall apply.

Exception No. 1: Occupancies that are completely separated from all portions of the building used for a residential board and care facility and its egress system by construction having a fire resistance rating of not less than 2 hours.

Exception No. 2: This requirement shall not apply to apartment buildings housing residential board and care occupancies in conformance with Section 32.4. In such facilities, any safeguards required by Section 32.4 that are more restrictive than those for other housed occupancies shall apply only to the extent prescribed by Section 32.4.

32.1.2.2 No board and care occupancy shall have its sole means of egress pass through any nonresidential or non-health care occupancy in the same building.

32.1.2.3 No board and care occupancy shall be located above a nonresidential or non-health care occupancy.

Exception: Where the board and care occupancy and exits therefrom are separated from the nonresidential or non-health care occupancy by construction having a fire resistance rating of not less than 2 hours.

32.1.3 Definitions.

Evacuation Capability. See 3.3.56.

Impractical Evacuation Capability. See 3.3.108.

Personal Care. See 3.3.145.

Point of Safety. See 3.3.151.

Prompt Evacuation Capability. See 3.3.154.

Residential Board and Care Occupancy. See 3.3.163.

Residential Board and Care Resident. See 3.3.164.

Slow Evacuation Capability. See 3.3.180.

Staff (Residential Board and Care). See 3.3.190.

Thermal Barrier. See 3.3.202.

32.1.4 Acceptability of Means of Egress or Escape. No means of escape or means of egress shall be considered as complying with the minimum criteria for acceptance unless emergency evacuation drills are regularly conducted using that route in accordance with the requirements of 32.7.3.

32.1.5* Fire resistance-rated assemblies shall comply with 8.2.3.

32.1.6 (Reserved.)

32.1.7 (Reserved.)

SECTION 32.2 SMALL FACILITIES

32.2.1 General.

32.2.1.1 Scope. Section 32.2 applies to residential board and care occupancies providing sleeping accommodations for not more than 16 residents. Where there are sleeping accommodations for more than 16 residents, the occupancy shall be classified as a large facility in accordance with Section 32.3.

32.2.1.2 Requirements Based on Evacuation Capability.

32.2.1.2.1 Small facilities shall comply with the requirements of Section 32.2 as indicated for the appropriate evacuation capability. The ability of all occupants, residents, staff, and family members shall be considered in determining evacuation capability.

Exception: Facilities where the authority having jurisdiction has determined equivalent safety is provided in accordance with Section 1.5.*

32.2.1.2.2 Facility management shall furnish to the authority having jurisdiction, upon request, an evacuation capability determination using a procedure acceptable to the authority having jurisdiction. Where such documentation is not furnished, the evacuation capability shall be classified as impractical.

32.2.1.3 Minimum Construction Requirements. (No special requirements.)

32.2.2 Means of Escape.

32.2.2.1 Number of Means of Escape. Each normally occupied story of the facility shall have not less than two remotely located means of escape that do not involve using windows. Not less than one of these means of escape shall be in accordance with 32.2.2.2. The provisions of Chapter 7 shall not apply to means of escape unless specifically referenced in this chapter.

Exception No. 1: In prompt evacuation capability facilities, one means of escape shall be permitted to involve windows complying with 32.2.2.3(c).

Exception No. 2: A second means of escape from each story shall not be required where the entire building is protected throughout by an approved automatic sprinkler system complying with 32.2.3.5 and the facility has two means of escape.

32.2.2.2 Primary Means of Escape. Every sleeping room and living area shall have access to a primary means of escape located to provide a safe path of travel to the outside. Where sleeping rooms or living areas are above or below the level of exit discharge, the primary means of escape shall be an inte-

rior stair in accordance with 32.2.2.4, an exterior stair, a horizontal exit, or a fire escape stair.

32.2.2.3 Secondary Means of Escape from Sleeping Rooms. In addition to the primary route, each sleeping room in facilities that use Exception No. 1 to 32.2.3.5.1 shall have a second means of escape that consists of one of the following.

(a) It shall be a door, stairway, passage, or hall providing a way of unobstructed travel to the outside of the dwelling at street or ground level that is independent of and remotely located from the primary means of escape.

(b) It shall be a passage through an adjacent nonlockable space, independent of and remotely located from the primary means of escape, to any approved means of escape.

(c) *It shall be an outside window or door operable from the inside without the use of tools, keys, or special effort that provides a clear opening of not less than 5.7 ft² (0.53 m²). The width shall be not less than 20 in. (51 cm), and the height shall be not less than 24 in. (61 cm). The bottom of the opening shall be not more than 44 in. (112 cm) above the floor. Such means of escape shall be acceptable where one of the following criteria are met:

- (1) The window shall be within 20 ft (6.1 m) of grade.
- (2) The window shall be directly accessible to fire department rescue apparatus as approved by the authority having jurisdiction.
- (3) The window or door shall open onto an exterior balcony.

Exception: If the sleeping room has a door leading directly to the outside of the building with access to grade or to a stairway that meets the requirements of exterior stairs in 32.2.3.1.2, that means of escape shall be considered as meeting all the escape requirements for the sleeping room.

32.2.2.4 Interior Stairs Used for Primary Means of Escape. Interior stairs shall be enclosed with 1/2-hour fire barriers, with all openings equipped with smoke-actuated automatic-closing or self-closing doors having a fire protection rating comparable to that required for the enclosure. Stairs shall comply with 7.2.2.5.3. The entire primary means of escape shall be arranged so that it is not necessary for occupants to pass through a portion of a lower story unless that route is separated from all spaces on that story by construction having not less than a 1/2-hour fire resistance rating.

In buildings of construction other than Type II(000), Type III(200), or Type V(000), the supporting construction shall be protected to afford the required fire resistance rating of the supported wall.

Exception No. 1: Stairs that connect a story at street level to only one other story shall be permitted to be open to the story that is not at street level.

Exception No. 2: Stair enclosures shall not be required for prompt and slow evacuation capability facilities in buildings of three or fewer stories that are protected with an approved automatic sprinkler system in accordance with 32.2.3.5. This exception shall be permitted only if a primary means of escape from each sleeping area still exists that does not pass through a portion of a lower floor, unless that route is separated from all spaces on that floor by construction having a 1/2-hour fire resistance rating.

Exception No. 3: Stair enclosures shall not be required in buildings of two or fewer stories that house prompt evacuation capability facilities with not more than eight residents. The exception to 32.2.3.4.3.1 shall not be used in conjunction with this exception. Exception No. 1 to 32.2.3.5.1 shall not be used in conjunction with this exception.

32.2.2.5 Doors.

32.2.2.5.1 Doors or paths of travel to a means of escape shall be not less than 32 in. (81 cm) wide.

Exception No. 1: Bathroom doors shall be not less than 24 in. (61 cm) wide.

Exception No. 2: In conversions (see 32.1.1.3), 28-in. (71-cm) doors shall be permitted to continue to be used.

32.2.2.5.2 Doors shall be swinging or sliding.

32.2.2.5.3 Every closet door latch shall be readily opened from the inside in case of an emergency.

32.2.2.5.4 Every bathroom door shall be designed to allow opening from the outside during an emergency when locked.

32.2.2.5.5 No door in any means of escape shall be locked against egress when the building is occupied.

Exception: Delayed-egress locks complying with 7.2.1.6.1 shall be permitted on exterior doors.

32.2.2.5.6 Doors shall comply with 7.2.1.4.5.

32.2.2.5.7 Doors shall comply with 7.2.1.5.4.

32.2.2.6 Stairs.

32.2.2.6.1 Stairs shall comply with 7.2.2.

32.2.2.6.2 Winders complying with 7.2.2.4 shall be permitted.

32.2.3 Protection.

32.2.3.1 Protection of Vertical Openings.

32.2.3.1.1 Vertical openings shall be protected so as not to expose a primary means of escape. Vertical openings shall be considered protected if separated by smoke partitions in accordance with 8.2.4 that prevent the passage of smoke from one story to any primary means of escape on another story. Smoke partitions shall have a fire resistance rating of not less than 1/2 hour. Any doors or openings to the vertical opening shall be capable of resisting fire for not less than 20 minutes.

Exception: Stairs shall be permitted to be open where complying with Exception No. 2 or Exception No. 3 to 32.2.2.4.

32.2.3.1.2 Exterior stairs shall be reasonably protected against blockage caused by fire that would simultaneously expose both the interior and the exterior means of escape. Such protection shall be accomplished through separation by physical distance, arrangement of the stairs, protection of the openings exposing the stairs, or other means acceptable to the authority having jurisdiction.

32.2.3.2 Protection from Hazards. Any hazardous area shall be protected in accordance with 32.2.3.2.1 and 32.2.3.2.3.

32.2.3.2.1 Any space where there is storage or activity having fuel conditions exceeding that of a one- or two-family dwelling and that possesses the potential for a fully involved fire shall be protected in accordance with 32.2.3.2.2 and 32.2.3.2.3. Areas shall include, but shall not be limited to, areas for cartoned storage, food or household maintenance items in wholesale or institutional-type quantities and concentrations, or mass storage of residents' belongings. Areas containing approved, properly installed and maintained furnaces and heating equipment, furnace rooms, and cooking and laundry facilities shall not be classified as hazardous areas solely on the basis of such equipment.

32.2.3.2.2 Any hazardous area that is on the same floor as, and is in or abuts, a primary means of escape or a sleeping room shall be protected by one of the following means.

(a) Protection shall be an enclosure with a fire resistance rating of not less than 1 hour, with a self-closing or automatic-closing fire door in accordance with 7.2.1.8 that has a fire protection rating of not less than $\frac{3}{4}$ hour. The enclosure shall be protected by an automatic fire detection system connected to the fire alarm system provided in 32.2.3.4.1.

(b) Protection shall be automatic sprinkler protection, in accordance with 32.2.3.5, and a smoke partition, in accordance with 8.2.4, located between the hazardous area and the sleeping area or primary escape route. Any doors in such separation shall be self-closing or automatic-closing in accordance with 7.2.1.8.

32.2.3.2.3 Other hazardous areas shall be protected by one of the following:

- (1) An enclosure having a fire resistance rating of not less than $\frac{1}{2}$ hour, with a self-closing or automatic-closing door in accordance with 7.2.1.8 that is equivalent to not less than $1\frac{3}{4}$ -in. (4.4-cm) thick, solid-bonded wood core construction and is protected by an automatic fire detection system connected to the fire alarm system provided in 32.2.3.4.1.
- (2) Automatic sprinkler protection in accordance with 32.2.3.5, regardless of enclosure

32.2.3.3 Interior Finish.

32.2.3.3.1 Interior finish shall be in accordance with Section 10.2.

32.2.3.3.2 Interior Wall and Ceiling Finish. Interior wall and ceiling finish materials complying with 10.2.3 shall be Class A or Class B.

Exception: Class C interior wall and ceiling finish shall be permitted in prompt evacuation capability facilities.

32.2.3.3.3 Interior Floor Finish. (No requirements.)

32.2.3.4 Detection, Alarm, and Communications Systems.

32.2.3.4.1 Fire Alarm Systems. A manual fire alarm system shall be provided in accordance with Section 9.6.

32.2.3.4.2 Occupant Notification. Occupant notification shall be provided automatically, without delay, in accordance with 9.6.3.

32.2.3.4.3 Smoke Alarms.

32.2.3.4.3.1 Approved smoke alarms shall be provided in accordance with 9.6.2.10. Smoke alarms shall be installed on all levels, including basements but excluding crawl spaces and unfinished attics. Additional smoke alarms shall be installed for all living areas as defined in 3.3.119.

Exception: Smoke alarms shall not be required in buildings protected throughout by an approved automatic sprinkler system in accordance with 32.2.3.5.

32.2.3.4.3.2 Each sleeping room shall be provided with an approved, listed single-station smoke alarm in accordance with 9.6.2.10.

32.2.3.5 Automatic Extinguishing Systems.

32.2.3.5.1 All facilities shall be protected throughout by an approved automatic sprinkler system in accordance with

32.2.3.5.2. Quick-response or residential sprinklers shall be provided.

Exception No. 1: In conversions, sprinklers shall not be required in small board and care homes with a rating of prompt evacuation capability and serving eight or fewer residents.

Exception No. 2: Standard response sprinklers shall be permitted for use in hazardous areas in accordance with 32.2.3.2.

32.2.3.5.2* Where an automatic sprinkler system is installed, for either total or partial building coverage, the system shall be in accordance with Section 9.7 and shall initiate the fire alarm system in accordance with 32.2.3.4.1. The adequacy of the water supply shall be documented to the authority having jurisdiction.

Exception No. 1: In prompt evacuation capability facilities, an automatic sprinkler system in accordance with NFPA 13D, Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes, shall be permitted. Facilities with more than eight residents shall be treated as two-family dwellings with regard to water supply. Additionally, entrance foyers shall be sprinklered.*

Exception No. 2: In slow and impractical evacuation capability facilities, an automatic sprinkler system in accordance with NFPA 13D, Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes, with a 30-minute water supply, shall be permitted. All habitable areas and closets shall be sprinklered. Facilities with more than eight residents shall be treated as two-family dwellings with regard to water supply.

Exception No. 3: In prompt and slow evacuation capability facilities, where an automatic sprinkler system is in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems, automatic sprinklers shall not be required in closets not exceeding 24 ft² (2.2 m²) and in bathrooms not exceeding 55 ft² (5.1 m²), provided that such spaces are finished with lath and plaster or material providing a 15-minute thermal barrier.

Exception No. 4: In prompt and slow evacuation capability facilities up to and including four stories in height, systems in accordance with NFPA 13R, Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height, shall be permitted.

Exception No. 5: In impractical evacuation capability facilities up to and including four stories in height, systems in accordance with NFPA 13R, Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height, shall be permitted. All habitable areas and closets shall be sprinklered.

Exception No. 6: Initiation of the fire alarm system shall not be required for existing installations in accordance with 32.2.3.5.5.

32.2.3.5.3 Automatic sprinkler systems installed in prompt and slow evacuation capability facilities shall have valve supervision by one of the following methods:

- (1) A single listed control valve that shuts off both domestic and sprinkler systems and a separate shutoff for the domestic system only
- (2) Central station, proprietary, or remote station alarm in accordance with Section 9.6
- (3) Valve closure that causes the sounding of an audible signal in the facility

32.2.3.5.4 Automatic sprinkler systems installed in impractical evacuation capability facilities shall be supervised in accordance with Section 9.7.

32.2.3.5.5 Sprinkler piping serving not more than six sprinklers for any isolated hazardous area shall be permitted to be installed in accordance with 9.7.1.2. In new installations, where more than two sprinklers are installed in a single area, waterflow detection shall be provided to initiate the fire alarm system required by 32.2.3.4.1. Duration of water supplies shall be as required for the sprinkler systems addressed in 32.2.3.5.2.

32.2.3.6 Construction of Corridor Walls.

32.2.3.6.1 The separation walls of sleeping rooms shall be capable of resisting fire for not less than $1/2$ hour, which is considered to be achieved if the partitioning is finished on both sides with lath and plaster or materials providing a 15-minute thermal barrier. Sleeping room doors shall be substantial doors, such as those of $1\frac{3}{4}$ -in. (4.4-cm) thick, solid-bonded wood core construction or other construction of equal or greater stability and fire integrity. Any vision panels shall be fixed fire window assemblies in accordance with 8.2.3.2.2 or shall be wired glass not exceeding 1296 in.² (0.84 m²) each in area and installed in approved frames.

Exception No. 1: In prompt evacuation capability facilities, all sleeping rooms shall be separated from the escape route by smoke partitions in accordance with 8.2.4. Door closing shall be regulated by 32.2.3.6.4.

Exception No. 2: This requirement shall not apply to corridor walls that are smoke partitions in accordance with 8.2.4 and that are protected by automatic sprinklers in accordance with 32.2.3.5 on both sides of the wall and door. In such instances, there shall be no limitation on the type or size of glass panels. Door closing shall be regulated by 32.2.3.6.4.

Exception No. 3: Sleeping arrangements that are not located in sleeping rooms shall be permitted for nonresident staff members, provided that the audibility of the alarm in the sleeping area is sufficient to awaken staff who might be sleeping.

32.2.3.6.2 No louvers or operable transoms or other air passages shall penetrate the wall, except properly installed heating and utility installations other than transfer grilles. Transfer grilles shall be prohibited.

32.2.3.6.3 Doors shall be provided with latches or other mechanisms suitable for keeping the doors closed. No doors shall be arranged to prevent the occupant from closing the door.

32.2.3.6.4 Doors shall be self-closing or automatic-closing in accordance with 7.2.1.8.

Exception: Door-closing devices shall not be required in buildings protected throughout by an approved automatic sprinkler system in accordance with 32.2.3.5.1.

32.2.4 (Reserved.)

32.2.5 Building Services.

32.2.5.1 Utilities. Utilities shall comply with Section 9.1.

32.2.5.2 Heating, Ventilating, and Air Conditioning.

32.2.5.2.1 Heating, ventilating, and air conditioning equipment shall comply with the provisions of 9.2.1 and 9.2.2, except as otherwise required in this chapter.

32.2.5.2.2 No stove or combustion heater shall be located to block escape in case of fire caused by the malfunction of the stove or heater.

32.2.5.2.3 Unvented fuel-fired heaters shall not be used in any residential board and care facility.

32.2.5.3 Elevators, Escalators, and Conveyors. Any elevators, escalators, and conveyors installed shall comply with the provisions of Section 9.4.

SECTION 32.3 LARGE FACILITIES

32.3.1 General.

32.3.1.1 Scope. Section 32.3 applies to residential board and care occupancies providing sleeping accommodations for more than 16 residents. Facilities having sleeping accommodations for not more than 16 residents shall be evaluated in accordance with Section 32.2.

32.3.1.2 Requirements Based on Evacuation Capability.

32.3.1.2.1 Prompt and Slow. Large facilities classified as prompt or slow evacuation capability shall comply with the requirements of Section 32.3 as indicated for the appropriate evacuation capability.

Exception: Facilities where the authority having jurisdiction has determined equivalent safety is provided in accordance with Section 1.5.*

32.3.1.2.2 Impractical. Large facilities classified as impractical evacuation capability shall meet the requirements for limited care facilities in Chapter 18.

Exception: Facilities where the authority having jurisdiction has determined equivalent safety is provided in accordance with Section 1.5.*

32.3.1.2.3 Facility management shall furnish to the authority having jurisdiction, upon request, an evacuation capability determination using a procedure acceptable to the authority having jurisdiction. Where such documentation is not furnished, the evacuation capability shall be classified as impractical.

32.3.1.3 Minimum Construction Requirements.

32.3.1.3.1 Construction requirements for large facilities shall be as required by 32.3.1.3. Where noted as "fully sheathed," the interior shall be covered with lath and plaster or materials providing a 15-minute thermal barrier.

32.3.1.3.2 For the purpose of construction requirements, stories shall be counted starting with the primary level of exit discharge and ending with the highest occupied level. Where the primary level of exit discharge is not readily apparent, the primary level of exit discharge of a building shall be that story that is level with or above finished grade of the exterior wall line for 50 percent or more of its perimeter. Building levels below the primary level shall not be counted as a story in determining the height of the building.

32.3.1.3.3 The minimum construction requirements (see 8.2.1), based on the highest story normally used by board and care residents, shall be as follows.

(a) *One- or Two-Story Facilities.* Any construction type that meets the requirements for a 1-hour or greater fire resistance rating, that is Type IV(2HH), that is fully sheathed, or that is protected throughout by an approved, supervised automatic sprinkler system in accordance with 32.3.3.5.

Exception: One-story prompt evacuation capability facilities having 30 or fewer residents shall be permitted to be of any type construction.

(b) *Three- to Six-Story Facilities.* Type I, Type II, or Type III construction that meets the requirements for a 1-hour or greater fire resistance rating; Type IV construction that is protected throughout by an approved automatic sprinkler system

in accordance with 32.3.3.5; or any other type of construction that is both sheathed and protected throughout by an approved, supervised automatic sprinkler system in accordance with 32.3.3.5, other than Type V(000).

Exception: Three- to four-story facilities of Type V(000) construction that are both fully sheathed and protected throughout by an approved, supervised automatic sprinkler system in accordance with 32.3.3.5.

(c) *Facilities More than Six Stories High.* Any Type I or Type II(222) construction, and any Type II(111), Type III(211), or Type IV(2HH) construction that is protected throughout by an approved, supervised automatic sprinkler system in accordance with 32.3.3.5.

Exception: Any building of Type I, Type II(222), or Type II(111) construction shall be permitted to include roofing systems involving combustible supports, decking, or roofing, provided that the following criteria are met:

(a) *The roof covering meets Class A requirements in accordance with NFPA 256, Standard Methods of Fire Tests of Roof Coverings.*

(b) *The roof is separated from all occupied portions of the building by a noncombustible floor assembly having not less than a 2-hour fire resistance rating that includes not less than 2¹/₂ in. (6.4 cm) of concrete or gypsum fill. To qualify for this exception, the attic or other space so developed shall be either unused or protected throughout by an approved, supervised automatic sprinkler system in accordance with 32.3.3.5.1.*

32.3.1.4 Occupant Load. The occupant load, in number of persons for whom means of egress and other provisions are required, shall be determined on the basis of the occupant load factors of Table 7.3.1.2 that are characteristic of the use of the space or shall be determined as the maximum probable population of the space under consideration, whichever is greater.

32.3.2 Means of Egress.

32.3.2.1 Means of egress shall be in accordance with Chapter 7.

32.3.2.2 Means of Egress Components.

32.3.2.2.1 Components of means of egress shall be limited to the types described in 32.3.2.2.2 through 32.3.2.2.10.

32.3.2.2.2 Doors. Doors in means of egress shall be as follows:

- (1) Doors complying with 7.2.1 shall be permitted.
- (2) Doors within individual rooms and suites of rooms shall be permitted to be swinging or sliding.
- (3) No door in any means of egress shall be locked against egress when the building is occupied.

Exception No. 1: The requirement of 32.3.2.2.2(3) shall not apply to delayed-egress locks in accordance with 7.2.1.6.1, provided that not more than one device exists in a means of egress.

Exception No. 2: The requirement of 32.3.2.2.2(3) shall not apply to access-controlled egress doors in accordance with 7.2.1.6.2.

(4) Revolving doors complying with 7.2.1.10 shall be permitted.

(5) Every bathroom door shall be designed to allow opening from the outside during an emergency when locked.

32.3.2.2.3 Stairs. Stairs complying with 7.2.2 shall be permitted.

32.3.2.2.4 Smokeproof Enclosures. Smokeproof enclosures complying with 7.2.3 shall be permitted.

32.3.2.2.5 Horizontal Exits. Horizontal exits complying with 7.2.4 shall be permitted.

32.3.2.2.6 Ramps. Ramps complying with 7.2.5 shall be permitted.

32.3.2.2.7 Exit Passageways. Exit passageways complying with 7.2.6 shall be permitted.

32.3.2.2.8 Fire Escape Ladders. Fire escape ladders complying with 7.2.9 shall be permitted.

32.3.2.2.9 Alternating Tread Devices. Alternating tread devices complying with 7.2.11 shall be permitted.

32.3.2.2.10 Areas of Refuge. Areas of refuge complying with 7.2.12 shall be permitted.

32.3.2.3 Capacity of Means of Egress.

32.3.2.3.1 The capacity of means of egress shall be in accordance with Section 7.3.

32.3.2.3.2 Street floor exits shall be sufficient for the occupant load of the street floor plus the required capacity of stairs and ramps discharging onto the street floor.

32.3.2.3.3 The width of corridors shall be sufficient for the occupant load served but shall be not less than 44 in. (112 cm).

Exception: Corridors serving an occupant load fewer than 50 shall be not less than 36 in. (91 cm) wide.

32.3.2.4 Number of Exits. Not less than two exits shall be accessible from every story, including floors below the level of exit discharge and floors occupied for public purposes.

32.3.2.5 Arrangement of Means of Egress.

32.3.2.5.1 Access to all required exits shall be in accordance with Section 7.5.

32.3.2.5.2 Common paths of travel shall not exceed 125 ft (38.1 m).

32.3.2.5.3 Dead-end corridors shall not exceed 50 ft (15 m).

32.3.2.5.4 Any room or any suite of rooms exceeding 2000 ft² (185 m²) shall be provided with not less than two exit access doors remotely located from each other.

32.3.2.6 Travel Distance to Exits.

32.3.2.6.1 Travel distance within a room, suite, or living unit to a corridor door shall not exceed 125 ft (38.1 m).

32.3.2.6.2 Travel distance from the corridor door of any room to the nearest exit, measured in accordance with Section 7.6, shall not exceed 200 ft (60 m).

32.3.2.7 Discharge from Exits. Exit discharge shall comply with Section 7.7.

32.3.2.8 Illumination of Means of Egress. Means of egress shall be illuminated in accordance with Section 7.8.

32.3.2.9 Emergency Lighting. Emergency lighting in accordance with Section 7.9 shall be provided in all buildings with more than 25 rooms.

Exception: Where each sleeping room has a direct exit to the outside of the building at ground level, no emergency lighting shall be required.

32.3.2.10 Marking of Means of Egress. Means of egress shall be marked in accordance with Section 7.10.

32.3.2.11 Special Means of Egress Features. (Reserved.)

32.3.3 Protection.**32.3.3.1 Protection of Vertical Openings.**

32.3.3.1.1 Any vertical opening shall be enclosed or protected in accordance with 8.2.5.

32.3.3.1.2 No floor below the level of exit discharge used only for storage, heating equipment, or purposes other than residential occupancy shall have unprotected openings to floors used for residential occupancy.

32.3.3.2 Protection from Hazards.

32.3.3.2.1 Any room containing high-pressure boilers, refrigerating machinery, transformers, or other service equipment subject to possible explosion shall not be located directly under or adjacent to exits. All such rooms shall be effectively separated from other parts of the building as specified in Section 8.4.

32.3.3.2.2 Every hazardous area shall be separated from other parts of the building by a smoke partition in accordance with 8.2.4. Hazardous areas shall include, but shall not be limited to the following:

- (1) Boiler and heater rooms
- (2) Laundries
- (3) Repair shops
- (4) Rooms or spaces used for storage of combustible supplies and equipment in quantities deemed hazardous by the authority having jurisdiction

32.3.3.3 Interior Finish.

32.3.3.3.1 Interior finish shall be in accordance with Section 10.2.

32.3.3.3.2 Interior Wall and Ceiling Finish. Interior wall and ceiling finish materials complying with 10.2.3 shall be permitted as follows:

- (1) Exit enclosures — Class A
- (2) Lobbies and corridors — Class A or Class B
- (3) Other spaces — Class A or Class B

32.3.3.3.3 Interior Floor Finish. Interior floor finish in accordance with 10.2.7 shall be Class I or Class II in corridors and exits.

32.3.3.4 Detection, Alarm, and Communications Systems.

32.3.3.4.1 General. A fire alarm system in accordance with Section 9.6 shall be provided.

32.3.3.4.2 Initiation. The required fire alarm system shall be initiated by the following means:

- (1) Manual means in accordance with 9.6.2
- (2) A manual fire alarm box located at a convenient central control point under continuous supervision of responsible employees
- (3) The automatic sprinkler system
- (4) Any required detection system

32.3.3.4.3 Annunciator Panel. An annunciator panel connected with the fire alarm system shall be provided. The location of the annunciator shall be approved by the authority having jurisdiction.

Exception: Buildings not more than two stories in height and with not more than 50 sleeping rooms.

32.3.3.4.4 Occupant Notification. Occupant notification shall be provided automatically, without delay, in accordance with 9.6.3.

32.3.3.4.5 High-rise buildings shall be provided with an approved means of voice communication in accordance with 9.6.3.

Exception: Buildings equipped with a public address system.

32.3.3.4.6* Fire Department Notification. In case of a fire, provisions shall be made for the immediate notification of the public fire department by either telephone or other means. Where there is no public fire department, this notification shall be made to the private fire brigade.

32.3.3.4.7 Smoke Alarms. Each sleeping room shall be provided with an approved smoke alarm in accordance with 9.6.2.10 that is powered from the building electrical system.

32.3.3.4.8 Smoke Detection Systems. All living areas as defined in 3.3.119 and corridors shall be provided with smoke detectors in accordance with NFPA 72, *National Fire Alarm Code*, that are arranged to initiate an alarm that is audible in all sleeping areas.

Exception No. 1: Detectors shall not be required in living areas in facilities protected throughout by an approved, supervised automatic sprinkler system in accordance with 32.3.3.5.

Exception No. 2: Unenclosed corridors, passageways, balconies, colonnades, or other arrangements with one or more sides along the long dimension fully or extensively open to the exterior at all times.

32.3.3.5 Extinguishment Requirements.

32.3.3.5.1* All buildings shall be protected throughout by an approved automatic sprinkler system in accordance with Section 9.7. Quick-response or residential sprinklers shall be provided throughout.

Exception No. 1: In buildings not more than four stories in height, a sprinkler system complying with NFPA 13R, Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height, shall be permitted.

Exception No. 2: Automatic sprinklers shall not be required in small clothes closets where the smallest dimension does not exceed 3 ft (0.9 m), the area does not exceed 24 ft² (2.2 m²), and the walls and ceiling are finished with noncombustible or limited-combustible materials.

Exception No. 3: Standard response sprinklers shall be permitted for use in hazardous areas in accordance with 32.3.3.2.

32.3.3.5.2 (Reserved.)

32.3.3.5.3 Automatic sprinkler systems shall be supervised in accordance with Section 9.7.

32.3.3.5.4 (Reserved.)

32.3.3.5.5 Portable Fire Extinguishers. Portable fire extinguishers in accordance with 9.7.4.1 shall be provided near hazardous areas.

32.3.3.6 Corridors and Separation of Sleeping Rooms.

32.3.3.6.1 Access shall be provided from every resident use area to not less than one means of egress that is separated from all sleeping rooms by walls complying with 32.3.3.6.3 through 32.3.3.6.6.

32.3.3.6.2 Sleeping rooms shall be separated from corridors, living areas, and kitchens by walls complying with 32.3.3.6.3 through 32.3.3.6.6.

32.3.3.6.3 Walls required by 32.3.3.6.1 or 32.3.3.6.2 shall have a fire resistance rating of not less than $1/2$ hour.

Exception: In conversions (see 32.1.1.3), no fire resistance rating shall be required, but the wall shall be a smoke partition in accordance with 8.2.4. The provisions of 8.2.4.3.5 shall not apply.

32.3.3.6.4 Doors in walls required by 32.3.3.6.1 or 32.3.3.6.2 shall have a fire protection rating of not less than 20 minutes.

Exception: Doors in renovations and conversions (see 32.1.1.3) that are nonrated doors that resist the passage of smoke shall be permitted to continue to be used.

32.3.3.6.5 Walls and doors required by 32.3.3.6.1 and 32.3.3.6.2 shall be constructed as smoke partitions in accordance with 8.2.4. The provisions of 8.2.4.3.5 shall not apply. No louvers, transfer grilles, operable transoms, or other air passages shall penetrate such walls or doors, except properly installed heating and utility installations.

32.3.3.6.6 Doors to hazardous areas, vertical openings, exits, and exit passageways shall be self-closing or automatic-closing.

32.3.3.7 Subdivision of Building Spaces. (Reserved.)

32.3.4 Special Provisions. (Reserved.)

32.3.5 (Reserved.)

32.3.6 Building Services.

32.3.6.1 Utilities. Utilities shall comply with the provisions of Section 9.1.

32.3.6.2 Heating, Ventilating, and Air Conditioning.

32.3.6.2.1 Heating, ventilating, and air conditioning equipment shall comply with the provisions of Section 9.2.

32.3.6.2.2 No stove or combustion heater shall be located to block escape in case of fire caused by the malfunction of the stove or heater.

32.3.6.2.3 Unvented fuel-fired heaters shall not be used in any board and care occupancy.

32.3.6.3 Elevators, Dumbwaiters, and Vertical Conveyors.

32.3.6.3.1 Elevators, dumbwaiters, and vertical conveyors shall comply with the provisions of Section 9.4.

32.3.6.3.2* In high-rise buildings, one elevator shall be provided with a protected power supply and shall be available for use by the fire department in case of emergency.

32.3.6.4 Rubbish Chutes, Incinerators, and Laundry Chutes. Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 9.5.

SECTION 32.4* SUITABILITY OF AN APARTMENT BUILDING TO HOUSE A BOARD AND CARE OCCUPANCY

32.4.1 General.

32.4.1.1 Scope. Section 32.4 applies to apartment buildings that have one or more individual apartments used as a board and care occupancy. Section 32.4 determines the suitability of such buildings to house a residential board and care facility. The suitability of such buildings for apartments not used for board and care occupancies is covered in Chapter 30.

Exception: If a new board and care occupancy is created in an existing apartment building, the suitability of such buildings for apartments not used for board and care occupancies shall be covered by Chapter 31.

32.4.1.2 Requirements for individual apartments used as residential board and care occupancies shall be as specified in Section 32.2. Egress from the apartment into the common building corridor shall be considered acceptable egress from the board and care facility.

32.4.1.3 Requirements Based on Evacuation Capability.

32.4.1.3.1 Apartment buildings housing board and care facilities shall comply with the requirements of Section 32.4.

Exception: Facilities where the authority having jurisdiction has determined that equivalent safety for housing a residential board and care facility is provided in accordance with Section 1.5.*

32.4.1.3.2 All facilities shall meet the requirements of Chapter 30 and the additional requirements of Section 32.4.

32.4.1.4 Minimum Construction Requirements. In addition to the requirements of Chapter 30, apartment buildings housing residential board and care facilities for groups classified as prompt or slow evacuation capability shall meet the construction requirements of 32.3.1.3, and those for groups classified as impractical evacuation capability shall meet the construction requirements of 18.1.6. In applying the construction requirements, the height shall be determined by the height of the residential board and care facility measured above the primary level of exit discharge.

Exception: If the new board and care occupancy is created in an existing apartment building, the construction requirements of 32.3.1.3 shall apply for prompt or slow evacuation capability, and the construction requirements of 19.1.6 shall apply for impractical evacuation capability.

32.4.2 Means of Egress. The requirements of Section 30.2 shall apply only to the parts of means of egress serving the apartment(s) used as a residential board and care occupancy.

Exception: If the new board and care occupancy is created in an existing apartment building, the requirements of Section 31.2 shall apply to the parts of the means of egress serving the apartment(s) used as a residential board and care occupancy.

32.4.3 Protection.

32.4.3.1 Interior Finish. The requirements of 30.3.3 shall apply only to the parts of means of egress serving the apartment(s) used as a residential board and care occupancy.

Exception: If the new board and care occupancy is created in an existing apartment building, the requirements of 31.3.3 shall apply to the parts of the means of egress serving the apartment(s) used as a residential board and care occupancy.

32.4.3.2 Construction of Corridor Walls. The requirements of 30.3.6 shall apply only to corridors serving the residential board and care facility, including that portion of the corridor wall separating the residential board and care facility from the common corridor.

Exception: If the new board and care occupancy is created in an existing apartment building, the requirements of 31.3.6 shall apply to the corridor serving the residential board and care facility.

32.4.3.3 Subdivision of Building Spaces. (Reserved.)

SECTION 32.5 RESERVED**SECTION 32.6 RESERVED****SECTION 32.7 OPERATING FEATURES**

32.7.1 Emergency Plan. The administration of every residential board and care facility shall have, in effect and available to all supervisory personnel, written copies of a plan for protecting all persons in the event of fire, for keeping persons in place, for evacuating persons to areas of refuge, and for evacuating persons from the building when necessary. The plan shall include special staff response, including the fire protection procedures needed to ensure the safety of any resident, and shall be amended or revised whenever any resident with unusual needs is admitted to the home. All employees shall be periodically instructed and kept informed with respect to their duties and responsibilities under the plan. Such instruction shall be reviewed by the staff not less than every 2 months. A copy of the plan shall be readily available at all times within the facility.

32.7.2 Resident Training. All residents participating in the emergency plan shall be trained in the proper actions to be taken in the event of fire. This training shall include actions to be taken if the primary escape route is blocked. If the resident is given rehabilitation or habilitation training, training in fire prevention and the actions to be taken in the event of a fire shall be a part of the training program. Residents shall be trained to assist each other in case of fire to the extent that their physical and mental abilities permit them to do so without additional personal risk.

32.7.3 Emergency Egress and Relocation Drills. Emergency egress and relocation drills shall be conducted not less than six times per year on a bimonthly basis, with not less than two drills conducted during the night when residents are sleeping. The drills shall be permitted to be announced in advance to the residents. The drills shall involve the actual evacuation of all residents to an assembly point as specified in the emergency plan and shall provide residents with experience in

egressing through all exits and means of escape required by the *Code*. Exits and means of escape not used in any drill shall not be credited in meeting the requirements of this *Code* for board and care facilities.

Exception No. 1: Actual exiting from windows shall not be required to comply with 32.7.3; opening the window and signaling for help shall be an acceptable alternative.

Exception No. 2: If the board and care facility has an evacuation capability classification of impractical, those residents who cannot meaningfully assist in their own evacuation or who have special health problems shall not be required to actively participate in the drill. Section 18.7 shall apply in such instances.

32.7.4 Smoking.

32.7.4.1* Smoking regulations shall be adopted by the administration of board and care occupancies.

32.7.4.2 Where smoking is permitted, noncombustible safety-type ashtrays or receptacles shall be provided in convenient locations.

32.7.5* Furnishings, Bedding, and Decorations.

32.7.5.1 New draperies, curtains, and other similar loosely hanging furnishings and decorations in board and care facilities shall be in accordance with the provisions of 10.3.1.

32.7.5.2* New upholstered furniture within board and care facilities shall be tested in accordance with the provisions of 10.3.2(1) and 10.3.3.

Exception: Upholstered furniture belonging to the resident in sleeping rooms, provided that a smoke alarm is installed in such rooms. Battery-powered single-station smoke alarms shall be permitted.

32.7.5.3* New mattresses within board and care facilities shall be tested in accordance with the provisions of 10.3.2(3) and 10.3.4.

Exception: Mattresses belonging to the resident in sleeping rooms, provided that a smoke alarm is installed in such rooms. Battery-powered single-station smoke alarms shall be permitted.

Chapter 33 EXISTING RESIDENTIAL BOARD AND CARE OCCUPANCIES

SECTION 33.1 GENERAL REQUIREMENTS

33.1.1* Application.

33.1.1.1 The requirements of this chapter apply to existing buildings or portions thereof currently occupied as residential board and care occupancies (*see also 32.1.1*).

33.1.1.2 This chapter is divided into five sections as follows:

- (1) Section 33.1 — General Requirements
- (2) Section 33.2 — Small Facilities (that is, sleeping accommodations for not more than 16 residents)
- (3) Section 33.3 — Large Facilities (that is, sleeping accommodations for more than 16 residents)
- (4) Section 33.4 — Suitability of an Apartment Building to House a Board and Care Occupancy
- (5) Section 33.7 — Operating Features (*Sections 33.5 and 33.6 are reserved.*)

33.1.1.3 Conversion. For the purposes of this chapter, exceptions for conversions shall apply only for a change of occupancy from an existing residential or health care occupancy to a residential board and care occupancy.

33.1.2 Mixed Occupancies.

33.1.2.1 Where another type of occupancy exists in the same building as a residential board and care occupancy, the requirements of 6.1.14 of this *Code* shall apply.

Exception No. 1: Occupancies that are completely separated from all portions of the building used for a residential board and care facility and its egress system by construction having a fire resistance rating of not less than 2 hours.

Exception No. 2: This requirement shall not apply to apartment buildings housing residential board and care occupancies in conformance with Section 33.4. In such facilities, any safeguards required by Section 33.4 that are more restrictive than those for other housed occupancies shall apply only to the extent prescribed by Section 33.4.

33.1.2.2 No board and care occupancy shall have its sole means of egress pass through any nonresidential or non-health care occupancy in the same building.

33.1.2.3 No board and care occupancy shall be located above a nonresidential or non-health care occupancy.

Exception No. 1: Where the board and care occupancy and exits therefrom are separated from the nonresidential or non-health care occupancy by construction having a fire resistance rating of not less than 2 hours.

Exception No. 2: Where a nonresidential or non-health care occupancy is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7 and is separated therefrom by construction with a fire-resistance rating of 1 hour.

33.1.3 Definitions.

Evacuation Capability. See 3.3.56.

Impractical Evacuation Capability. See 3.3.108.

Personal Care. See 3.3.145.

Point of Safety. See 3.3.151.

Prompt Evacuation Capability. See 3.3.154.

Residential Board and Care Occupancy. See 3.3.163.

Residential Board and Care Resident. See 3.3.164.

Slow Evacuation Capability. See 3.3.180.

Staff (Residential Board and Care). See 3.3.190.

Thermal Barrier. See 3.3.202.

33.1.4 Acceptability of Means of Egress or Escape. No means of escape or means of egress shall be considered as complying with the minimum criteria for acceptance unless emergency evacuation drills are regularly conducted using that route in accordance with the requirements of 33.7.3.

33.1.5* Fire resistance-rated assemblies shall comply with 8.2.3.

33.1.6 Changes in Facility Size. A change in facility size from small to large shall be considered a change in occupancy sub-classification and shall require compliance with the provisions applicable to new construction.

33.1.7* Changes in Group Evacuation Capability. A change in evacuation capability shall be permitted where the facility conforms to the requirements applicable to new construction, conversions, and the new evacuation capability.

Exception: Where the evacuation capability changes to a faster level.

SECTION 33.2 SMALL FACILITIES

33.2.1 General.

33.2.1.1 Scope. Section 32.2 applies to residential board and care occupancies providing sleeping accommodations for not more than 16 residents. Where there are sleeping accommodations for more than 16 residents, the occupancy shall be classified as a large facility in accordance with Section 33.3.

33.2.1.2 Requirements Based on Evacuation Capability.

33.2.1.2.1 Small facilities shall comply with the requirements of Section 33.2 as indicated for the appropriate evacuation capability. The ability of all occupants, residents, staff, and family members shall be considered in determining evacuation capability.

Exception No. 1: Facilities where the authority having jurisdiction has determined equivalent safety is provided in accordance with Section 1.5.*

Exception No. 2: Facilities that were previously approved as complying with the requirements for a large facility having the same evacuation capability.

33.2.1.2.2 Facility management shall furnish to the authority having jurisdiction, upon request, an evacuation capability determination using a procedure acceptable to the authority having jurisdiction. Where such documentation is not furnished, the evacuation capability shall be classified as impractical.

33.2.1.3 Minimum Construction Requirements.

33.2.1.3.1 Prompt Evacuation Capability. (No special requirements.)

33.2.1.3.2 Slow Evacuation Capability. The facility shall be housed in a building where the interior is fully sheathed with lath and plaster or other material providing a 15-minute thermal barrier, including all portions of bearing walls, bearing partitions, floor construction, and roofs. All columns, beams, girders, and trusses shall be similarly encased or otherwise shall provide not less than a $1\frac{1}{2}$ -hour fire resistance rating.

Exception No. 1: Exposed steel or wood columns, girders, and beams (but not joists) located in the basement.

Exception No. 2: Buildings of Type I, Type II(222), Type II(111), Type III(211), Type IV, or Type V(111) construction. (See 8.2.1.)

Exception No. 3: Areas protected by approved automatic sprinkler systems in accordance with 33.2.3.5.

Exception No. 4: Unfinished, unused, and essentially inaccessible loft, attic, or crawl spaces.

Exception No. 5: Where the facility can demonstrate to the authority having jurisdiction that the group is capable of evacuating the building in 8 minutes or less or achieves an E-score of three or less using the board and care occupancies evacuation capability determination methodology of NFPA 101A, Guide on Alternative Approaches to Life Safety.

33.2.1.3.3 Impractical Evacuation Capability. Buildings shall be of any construction type in accordance with 8.2.1 other than Type II(000), Type III(200), or Type V(000) construction.

Exception: Buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 33.2.3.5 shall be permitted to be of any type of construction.

33.2.2 Means of Escape.

33.2.2.1 Number of Means of Escape. Each normally occupied story of the facility shall have not less than two remotely located means of escape that do not involve using windows. Not less than one of these means of escape shall be in accordance with 33.2.2.2. The provisions of Chapter 7 shall not apply to means of escape unless specifically referenced in this chapter.

Exception No. 1: In prompt evacuation capability facilities, one means of escape shall be permitted to involve windows complying with 33.2.2.3(c).

Exception No. 2: A second means of escape from each story shall not be required where the entire building is protected throughout by an approved automatic sprinkler system complying with 33.2.3.5 and the facility has two means of escape. This exception shall not be permitted to be used in conjunction with Exception No. 2 to 33.2.2.3.

33.2.2.2 Primary Means of Escape.

33.2.2.2.1 Every sleeping room and living area shall have access to a primary means of escape located to provide a safe path of travel to the outside. Where sleeping rooms or living areas are above or below the level of exit discharge, the primary means of escape shall be an interior stair in accordance with 33.2.2.4, an exterior stair, a horizontal exit, or a fire escape stair.

33.2.2.2.2 In slow and impractical evacuation capability facilities, the primary means of escape for each sleeping room shall not be exposed to living areas and kitchens.

Exception: Buildings equipped with quick-response or residential sprinklers throughout. Standard response sprinklers shall be permitted for use in hazardous areas in accordance with 33.2.3.2.

33.2.2.3 Secondary Means of Escape from Sleeping Rooms. In addition to the primary route, each sleeping room shall have a second means of escape that consists of one of the following.

(a) It shall be a door, stairway, passage, or hall providing a way of unobstructed travel to the outside of the dwelling at street or ground level that is independent of and remotely located from the primary means of escape.

(b) It shall be a passage through an adjacent nonlockable space, independent of and remotely located from the primary means of escape, to any approved means of escape.

(c) *It shall be an outside window or door operable from the inside without the use of tools, keys, or special effort that provides a clear opening of not less than 5.7 ft² (0.53 m²). The width shall be not less than 20 in. (51 cm), and the height shall be not less than 24 in. (61 cm). The bottom of the opening shall be not more than 44 in. (112 cm) above the floor. Such means of escape shall be acceptable where the following criteria are met:

- (1) The window shall be within 20 ft (6.1 m) of grade.
- (2) The window shall be directly accessible to fire department rescue apparatus as approved by the authority having jurisdiction.
- (3) The window or door shall open onto an exterior balcony.

Exception No. 1: If the sleeping room has a door leading directly to the outside of the building with access to grade or to a stairway that meets the requirements of exterior stairs in 33.2.3.1.2, that means of escape shall be considered as meeting all the escape requirements for the sleeping room.

Exception No. 2: A second means of escape from each sleeping room shall not be required where the facility is protected throughout by an approved automatic sprinkler system in accordance with 33.2.3.5.

Exception No. 3: Existing approved means of escape shall be permitted to continue to be used.

33.2.2.4 Interior Stairs Used for Primary Means of Escape. Interior stairs shall be enclosed with 1/2-hour fire barriers, with all openings equipped with smoke-actuated automatic-closing or self-closing doors having a fire protection rating comparable to that required for the enclosure. Stairs shall comply with 7.2.2.5.3. The entire primary means of escape shall be arranged so that it is not necessary for occupants to pass through a portion of a lower story unless that route is separated from all spaces on that story by construction having not less than a 1/2-hour fire resistance rating.

In buildings of construction other than Type II(000), Type III(200), or Type V(000), the supporting construction shall be protected to afford the required fire resistance rating of the supported wall.

Exception No. 1: Stairs that connect a story at street level to only one other story shall be permitted to be open to the story that is not at street level.

Exception No. 2: Stair enclosures shall not be required in buildings of three or fewer stories that house prompt or slow evacuation capability facilities protected throughout by an approved automatic sprinkler system in accordance with 33.2.3.5 that uses quick-response or residential sprinklers. This exception shall be permitted only if a primary means of escape from each sleeping area still exists that does not pass through a portion of a lower floor, unless that route is separated from all spaces on that floor by construction having a 1/2-hour fire resistance rating.

Exception No. 3: Stair enclosures shall not be required in buildings of two or fewer stories that house prompt evacuation capability facilities with not more than eight residents and are protected by an approved automatic sprinkler system in accordance with 33.2.3.5 that uses quick-response or residential sprinklers. Exception No. 2 to 33.2.2.3 shall not be used in conjunction with this exception. The exceptions to 33.2.3.4.3 shall not be used in conjunction with this exception.

Exception No. 4: In buildings of three or fewer stories that house prompt or slow evacuation capability facilities protected by an approved automatic sprinkler system in accordance with 33.2.3.5, stairs shall be permitted to be open at the topmost story only. The entire primary means of escape of which the stairs are a part shall be separated from all portions of lower stories.

33.2.2.5 Doors.

33.2.2.5.1 Doors or paths of travel to a means of escape shall be not less than 28 in. (71 cm) wide.

Exception: Bathroom doors shall be not less than 24 in. (61 cm) wide.

33.2.2.5.2 Doors shall be swinging or sliding.

33.2.2.5.3 Every closet door latch shall be readily opened from the inside in case of an emergency.

33.2.2.5.4 Every bathroom door shall be designed to allow opening from the outside during an emergency when locked.

33.2.2.5.5 No door in any means of escape shall be locked against egress when the building is occupied.

Exception: Delayed-egress locks complying with 7.2.1.6.1 shall be permitted on exterior doors.

33.2.2.5.6 Doors shall comply with 7.2.1.4.5.

33.2.2.5.7 Doors shall comply with 7.2.1.5.4.

33.2.2.6 Stairs.

33.2.2.6.1 Stairs shall comply with 7.2.2.

33.2.2.6.2 Winders complying with 7.2.2.2.4 shall be permitted.

33.2.3 Protection.**33.2.3.1 Protection of Vertical Openings.**

33.2.3.1.1 Vertical openings shall be protected so as not to expose a primary means of escape. Vertical openings shall be considered protected if separated by smoke partitions in accordance with 8.2.4 that prevent the passage of smoke from one story to any primary means of escape on another story. Smoke partitions shall have a fire resistance rating of not less than $1\frac{1}{2}$ hour. Any doors or openings to the vertical opening shall be capable of resisting fire for not less than 20 minutes.

Exception: Stairs shall be permitted to be open where complying with Exception No. 2 or Exception No. 3 to 33.2.2.4.

33.2.3.1.2 Exterior stairs shall be reasonably protected against blockage caused by fire that would simultaneously expose both the interior and the exterior means of escape. Such protection shall be accomplished through separation by physical distance, arrangement of the stairs, protection of the openings exposing the stairs, or other means acceptable to the authority having jurisdiction.

33.2.3.2 Protection from Hazards. Any hazardous area shall be protected in accordance with 33.2.3.2.1 and 33.2.3.2.3.

33.2.3.2.1 Any space where there is storage or activity having fuel conditions exceeding that of a one- or two-family dwelling and that possesses the potential for a fully involved fire shall be protected in accordance with 33.2.3.2.2 and 33.2.3.2.3. Areas shall include, but shall not be limited to, areas for cartoned storage, food or household maintenance items in wholesale or institutional-type quantities and concentrations, or mass storage of residents' belongings. Areas containing approved, properly installed and maintained furnaces and heating equipment, furnace rooms, and cooking and laundry facilities shall not be classified as hazardous areas solely on the basis of such equipment.

33.2.3.2.2 Any hazardous area that is on the same floor as, and is in or abuts, a primary means of escape or a sleeping room shall be protected by one of the following means.

(a) Protection shall be an enclosure with a fire resistance rating of not less than 1 hour, with a self-closing or automatic-closing fire door in accordance with 7.2.1.8 that has a fire protection rating of not less than $\frac{3}{4}$ hour.

(b) Protection shall be automatic sprinkler protection, in accordance with 33.2.3.5, and a smoke partition, in accordance with 8.2.4, located between the hazardous area and the sleeping area or primary escape route. Any doors in such separation shall be self-closing or automatic-closing in accordance with 7.2.1.8.

33.2.3.2.3 Other hazardous areas shall be protected by one of the following:

- (1) An enclosure having a fire resistance rating of not less than $\frac{1}{2}$ hour, with a self-closing or automatic-closing door in accordance with 7.2.1.8 that is equivalent to not less than a $1\frac{3}{4}$ -in. (4.4-cm) thick, solid-bonded wood core construction
- (2) Automatic sprinkler protection in accordance with 33.2.3.5, regardless of enclosure

33.2.3.3 Interior Finish. Interior wall and ceiling finish shall be Class A or Class B in accordance with Section 10.2. There shall be no requirements for interior floor finish.

Exception: Class C interior wall and ceiling finish shall be permitted in prompt evacuation capability facilities.

33.2.3.4 Detection, Alarm, and Communications Systems.

33.2.3.4.1 Fire Alarm Systems. A manual fire alarm system shall be provided in accordance with Section 9.6.

Exception No. 1: Where there are interconnected smoke detectors meeting the requirements of 33.2.3.4.3 and there is not less than one manual fire alarm box per floor arranged to continuously sound the smoke detector alarms.

Exception No. 2: Other manually activated continuously sounding alarms acceptable to the authority having jurisdiction.

33.2.3.4.2 Occupant Notification. Occupant notification shall be in accordance with 9.6.3.

33.2.3.4.3* Smoke Alarms. Approved smoke alarms shall be provided in accordance with 9.6.2.10. These alarms shall be powered from the building electrical system and, when activated, shall initiate an alarm that is audible in all sleeping areas. Smoke alarms shall be installed on all levels, including basements but excluding crawl spaces and unfinished attics. Additional smoke alarms shall be installed for living rooms, dens, day rooms, and similar spaces.

Exception No. 1: Buildings protected throughout by an approved automatic sprinkler system, in accordance with 33.2.3.5, that uses quick-response or residential sprinklers, and protected with approved smoke alarms installed in each sleeping room, in accordance with 9.6.2.10, that are powered by the building electrical system.

Exception No. 2: Where buildings are protected throughout by an approved automatic sprinkler system, in accordance with 33.2.3.5, that uses quick-response or residential sprinklers, with existing battery-powered smoke alarms in each sleeping room, and where, in the opinion of the authority having jurisdiction, the facility has demonstrated that testing, maintenance, and a battery replacement program ensure the reliability of power to the smoke alarms.

33.2.3.5 Automatic Extinguishing Systems.

33.2.3.5.1 (Reserved.)

33.2.3.5.2* Where an automatic sprinkler system is installed, for either total or partial building coverage, the system shall be in accordance with Section 9.7 and shall activate the fire alarm system in accordance with 33.2.3.4.1. The adequacy of the water supply shall be documented to the authority having jurisdiction.

Exception No. 1: In prompt evacuation capability facilities, an automatic sprinkler system in accordance with NFPA 13D, Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes, shall be permitted. Automatic sprinklers shall not be required in closets not exceeding 24 ft² (2.2 m²) and in bathrooms not exceeding 55 ft² (5.1 m²), provided that such spaces are finished with lath and plaster or materials providing a 15-minute thermal barrier.

Exception No. 2: In slow and impractical evacuation capability facilities, an automatic sprinkler system in accordance with NFPA 13D, Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes, with a 30-minute water supply, shall be permitted. All habitable areas and closets shall be sprinklered. Automatic sprinklers shall not be required in bathrooms not exceeding 55 ft² (5.1 m²), provided that such spaces are finished with lath and plaster or materials providing a 15-minute thermal barrier.

Exception No. 3: In prompt and slow evacuation facilities, where an automatic sprinkler system is in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems, sprinklers shall not be required in closets not exceeding 24 ft² (2.2 m²) and in bathrooms not exceeding 55 ft² (5.1 m²), provided that such spaces are finished with lath and plaster or materials providing a 15-minute thermal barrier.

Exception No. 4: In prompt and slow evacuation capability facilities up to and including four stories in height, systems installed in accordance with NFPA 13R, Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height, shall be permitted.

Exception No. 5: In impractical evacuation capability facilities up to and including four stories in height, systems installed in accordance with NFPA 13R, Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height, shall be permitted. All habitable areas and closets shall be sprinklered. Automatic sprinklers shall not be required in bathrooms not exceeding 55 ft² (5.1 m²), provided that such spaces are finished with lath and plaster or materials providing a 15-minute thermal barrier.

Exception No. 6: Initiation of the fire alarm system shall not be required for existing installations in accordance with 33.2.3.5.5.

33.2.3.5.3 Impractical Evacuation Capability. All impractical evacuation capability facilities shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with 33.2.3.5.2.

33.2.3.5.4 (Reserved.)

33.2.3.5.5 Sprinkler piping serving not more than six sprinklers for any isolated hazardous area shall be permitted to be installed in accordance with 9.7.1.2. In new installations, where more than two sprinklers are installed in a single area, waterflow detection shall be provided to initiate the fire alarm system required by 33.2.3.4.1. Duration of water supplies shall be as required for the sprinkler systems addressed in 33.2.3.5.2.

33.2.3.6 Construction of Corridor Walls.

33.2.3.6.1 The separation walls of sleeping rooms shall be capable of resisting fire for not less than $\frac{1}{2}$ hour, which is consid-

ered to be achieved if the partitioning is finished on both sides with lath and plaster or materials providing a 15-minute thermal barrier. Sleeping room doors shall be substantial doors, such as those of $1\frac{3}{4}$ -in. (4.4-cm) thick, solid-bonded wood core construction or other construction of equal or greater stability and fire integrity. Any vision panels shall be fixed fire window assemblies in accordance with 8.2.3.2.2 or shall be wired glass not exceeding 1296 in.² (0.84 m²) each in area and installed in approved frames.

Exception No. 1: In prompt evacuation capability facilities, all sleeping rooms shall be separated from the escape route by smoke partitions in accordance with 8.2.4. Door closing shall be regulated by 33.2.3.6.4.

Exception No. 2: This requirement shall not apply to corridor walls that are smoke partitions in accordance with 8.2.4 and that are protected by automatic sprinklers in accordance with 33.2.3.5 on both sides of the wall and door. In such instances, there shall be no limitation on the type or size of glass panels. Door closing shall be regulated by 33.2.3.6.4.

Exception No. 3: Sleeping arrangements that are not located in sleeping rooms shall be permitted for nonresident staff members, provided that the audibility of the alarm in the sleeping area is sufficient to awaken staff who might be sleeping.

Exception No. 4: In previously approved facilities, where the facility has demonstrated to the authority having jurisdiction that the group is capable of evacuating the building in 8 minutes or less, or where the group achieves an E-score of three or less using the board and care occupancies evacuation capability determination methodology of NFPA 101A, Guide on Alternative Approaches to Life Safety, sleeping rooms shall be separated from escape routes by walls and doors that are smoke resistant.

33.2.3.6.2 No louvers or operable transoms or other air passages shall penetrate the wall, except properly installed heating and utility installations other than transfer grilles. Transfer grilles shall be prohibited.

33.2.3.6.3 Doors shall be provided with latches or other mechanisms suitable for keeping the doors closed. No doors shall be arranged to prevent the occupant from closing the door.

33.2.3.6.4 Doors shall be self-closing or automatic-closing in accordance with 7.2.1.8.

Exception: Door-closing devices shall not be required in buildings protected throughout by an approved automatic sprinkler system in accordance with 33.2.3.5.2.

33.2.4 (Reserved.)

33.2.5 Building Services.

33.2.5.1 Utilities. Utilities shall comply with Section 9.1.

33.2.5.2 Heating, Ventilating, and Air Conditioning.

33.2.5.2.1 Heating, ventilating, and air conditioning equipment shall comply with the provisions of 9.2.1 and 9.2.2, except as otherwise required in this chapter.

33.2.5.2.2 No stove or combustion heater shall be located to block escape in case of fire caused by the malfunction of the stove or heater.

33.2.5.2.3 Unvented fuel-fired heaters shall not be used in any residential board and care facility.

SECTION 33.3 LARGE FACILITIES

33.3.1 General.

33.3.1.1 Scope. Section 33.3 applies to residential board and care occupancies providing sleeping accommodations for more than 16 residents. Facilities having sleeping accommodations for not more than 16 residents shall be evaluated in accordance with Section 33.2. However, facilities meeting the requirements of this section shall be considered to meet the requirements of Section 33.2 for prompt evacuation capability or slow evacuation capability.

33.3.1.2 Requirements Based on Evacuation Capability.

33.3.1.2.1 Prompt and Slow. Large facilities classified as prompt or slow evacuation capability shall comply with the requirements of Section 33.3 as indicated for the appropriate evacuation capability.

*Exception No. 1:** Facilities where the authority having jurisdiction has determined equivalent safety is provided in accordance with Section 1.5.

Exception No. 2: Facilities that were previously approved as complying with 33.3.1.2.2.

33.3.1.2.2 Impractical. Large facilities classified as impractical evacuation capability shall meet the requirements for limited care facilities in Chapter 19.

*Exception:** Facilities where the authority having jurisdiction has determined equivalent safety is provided in accordance with Section 1.5.

33.3.1.2.3 Facility management shall furnish to the authority having jurisdiction, upon request, an evacuation capability determination using a procedure acceptable to the authority having jurisdiction. Where such documentation is not furnished, the evacuation capability shall be classified as impractical.

33.3.1.3 Minimum Construction Requirements.

33.3.1.3.1 Construction requirements for large facilities shall be as required by 33.3.1.3. Where noted as "fully sheathed," the interior shall be covered with lath and plaster or materials providing a 15-minute thermal barrier.

33.3.1.3.2 For the purpose of construction requirements, stories shall be counted starting with the primary level of exit discharge and ending with the highest occupied level. Where the primary level of exit discharge is not readily apparent, the primary level of exit discharge of a building shall be that story that is level with or above finished grade of the exterior wall line for 50 percent or more of its perimeter. Building levels below the primary level shall not be counted as a story in determining the height of the building.

33.3.1.3.3 The minimum construction requirements (see 8.2.1), based on the highest story normally used by board and care residents, shall be as follows.

(a) *One- or Two-Story Facilities.* Any construction type that meets the requirements for 1-hour or greater fire resistance rating, that is Type IV(2HH), that is fully sheathed, or that is protected throughout by an approved automatic sprinkler system in accordance with 33.3.3.5.

Exception: One-story prompt evacuation capability facilities having 30 or fewer residents shall be permitted to be of any type construction.

(b) *Three- to Six-Story Facilities.* Type I, Type II, or Type III construction that meets the requirements for 1-hour or greater fire resistance rating; Type IV construction that is protected throughout by an approved automatic sprinkler system

in accordance with 33.3.3.5; or any other type of construction that is both sheathed and protected throughout by an approved automatic sprinkler system installed in accordance with 33.3.3.5, other than Type V(000).

Exception: Three- to four-story facilities of Type V(000) construction that are both fully sheathed and protected throughout by an approved, supervised automatic sprinkler system in accordance with 33.3.3.5.

(c) *Facilities More than Six Stories High.* Any Type I or Type II(222) construction, and any Type II(111), Type III(211), or Type IV(2HH) construction that is protected throughout by an approved automatic sprinkler system in accordance with 33.3.3.5.

Exception: Any building of Type I, Type II(222), or Type II(111) construction shall be permitted to include roofing systems involving combustible supports, decking, or roofing, provided that the following criteria are met:

(a) The roof covering meets Class A requirements in accordance with NFPA 256, Standard Methods of Fire Tests of Roof Coverings.

(b) The roof is separated from all occupied portions of the building by a noncombustible floor assembly having not less than a 2-hour fire resistance rating that includes not less than 2¹/₂ in. (6.4 cm) of concrete or gypsum fill. To qualify for this exception, the attic or other space so developed shall be either unused or protected throughout by an approved automatic sprinkler system in accordance with 33.3.3.5.1.

33.3.1.4 Occupant Load. The occupant load, in number of persons for whom means of egress and other provisions are required, shall be determined on the basis of the occupant load factors of Table 7.3.1.2 that are characteristic of the use of the space or shall be determined as the maximum probable population of the space under consideration, whichever is greater.

33.3.2 Means of Egress.

33.3.2.1 Means of egress shall be in accordance with Chapter 7.

33.3.2.2 Means of Egress Components.

33.3.2.2.1 Components of means of egress shall be limited to the types described in 33.3.2.2.2 through 33.3.2.2.10.

33.3.2.2.2 Doors. Doors in means of egress shall be as follows:

- (1) Doors complying with 7.2.1 shall be permitted.
- (2) Doors within individual rooms and suites of rooms shall be permitted to be swinging or sliding.
- (3) No door in any means of egress shall be locked against egress when the building is occupied.

Exception No. 1: The requirement of 33.3.2.2.2(3) shall not apply to delayed-egress locks in accordance with 7.2.1.6.1, provided that not more than one device exists in a means of egress.

Exception No. 2: The requirement of 33.3.2.2.2(3) shall not apply to access-controlled egress doors in accordance with 7.2.1.6.2.

(4) Revolving doors complying with 7.2.1.10 shall be permitted.

33.3.2.2.3 Stairs. Stairs complying with 7.2.2 shall be permitted.

33.3.2.2.4 Smokeproof Enclosures. Smokeproof enclosures complying with 7.2.3 shall be permitted.

33.3.2.2.5 Horizontal Exits. Horizontal exits complying with 7.2.4 shall be permitted.

33.3.2.2.6 Ramps. Ramps complying with 7.2.5 shall be permitted.

33.3.2.2.7 Exit Passageways. Exit passageways complying with 7.2.6 shall be permitted.

33.3.2.2.8 Fire Escape Ladders. Fire escape ladders complying with 7.2.9 shall be permitted.

33.3.2.2.9 Alternating Tread Devices. Alternating tread devices complying with 7.2.11 shall be permitted.

33.3.2.2.10 Areas of Refuge. Areas of refuge complying with 7.2.12 shall be permitted.

33.3.2.3 Capacity of Means of Egress.

33.3.2.3.1 The capacity of means of egress shall be in accordance with Section 7.3.

33.3.2.3.2 Street floor exits shall be sufficient for the occupant load of the street floor plus the required capacity of stairs and ramps discharging onto the street floor.

33.3.2.3.3 The width of corridors shall be sufficient for the occupant load served but shall be not less than 44 in. (112 cm).

Exception: Corridors serving an occupant load fewer than 50 shall be not less than 36 in. (91 cm) wide.

33.3.2.3.4 Number of Exits. Not less than two exits shall be accessible from every story, including floors below the level of exit discharge and floors occupied for public purposes.

33.3.2.5 Arrangement of Means of Egress.

33.3.2.5.1 Access to all required exits shall be in accordance with Section 7.5.

33.3.2.5.2 Common paths of travel shall not exceed 110 ft (33.5 m).

Exception: In buildings protected throughout by automatic sprinkler systems in accordance with 33.3.3.5, common path of travel shall not exceed 160 ft (48.8 m).

33.3.2.5.3 Dead-end corridors shall not exceed 50 ft (15 m).

33.3.2.6 Travel Distance to Exits.

33.3.2.6.1 Travel distance from the door within a room, suite, or living unit to a corridor door shall not exceed 75 ft (23 m).

Exception: Travel distance shall not exceed 125 ft (48 m) in buildings protected throughout by an approved automatic sprinkler system in accordance with 33.3.3.5.

33.3.2.6.2 Travel distance from the corridor door of any room to the nearest exit, measured in accordance with Section 7.6, shall not exceed 100 ft (30 m).

Exception No. 1: Travel distance to exits shall not exceed 200 ft (60 m) for exterior ways of exit access arranged in accordance with 7.5.3.

Exception No. 2: Travel distance to exits shall not exceed 200 ft (60 m) if the exit access and any portion of the building that is tributary to the exit access are protected throughout by approved automatic sprinkler systems. In addition, the portion of the building in which the 200-ft (60-m) travel distance is permitted shall be separated from the remainder of the building by construction having a fire resistance rating of not less than 1 hour for buildings not more than three stories in height and not less than 2 hours for buildings more than three stories in height.

33.3.2.7 Discharge from Exits. Exit discharge shall comply with Section 7.7.

33.3.2.8 Illumination of Means of Egress. Means of egress shall be illuminated in accordance with Section 7.8.

33.3.2.9 Emergency Lighting. Emergency lighting in accordance with Section 7.9 shall be provided in all buildings with more than 25 rooms.

Exception: Where each sleeping room has a direct exit to the outside of the building at ground level, no emergency lighting shall be required.

33.3.2.10 Marking of Means of Egress. Means of egress shall be marked in accordance with Section 7.10.

33.3.2.11 Special Means of Egress Features. (Reserved.)

33.3.3 Protection.

33.3.3.1 Protection of Vertical Openings.

33.3.3.1.1 Any vertical opening shall be enclosed or protected in accordance with 8.2.5.

Exception No. 1: Unprotected vertical openings not part of required egress shall be permitted to be waived by the authority having jurisdiction where such openings do not endanger required means of egress. This exception shall apply only in buildings protected throughout by an approved automatic sprinkler system in accordance with 33.3.3.5.1 and in which exits and required ways of travel thereto are adequately safeguarded against fire and smoke within the building, or in which every individual room has direct access to an exterior exit without passing through a public corridor.

Exception No. 2: In buildings not more than two stories in height, unprotected vertical openings shall be permitted by the authority having jurisdiction if the building is protected throughout by an approved automatic sprinkler system in accordance with 33.3.3.5.1.

33.3.3.1.2 No floor below the level of exit discharge used only for storage, heating equipment, or purposes other than residential occupancy shall have unprotected openings to floors used for residential occupancy.

33.3.3.2 Protection from Hazards.

33.3.3.2.1 Any room containing high-pressure boilers, refrigerating machinery, transformers, or other service equipment subject to possible explosion shall not be located directly under or adjacent to exits. All such rooms shall be effectively separated from other parts of the building as specified in Section 8.4.

33.3.3.2.2 Every hazardous area shall be separated from other parts of the building by construction having a fire resistance rating of not less than 1 hour, with communicating openings protected by approved self-closing fire doors, or such area shall be equipped with automatic fire extinguishing systems. Hazardous areas shall include, but shall not be limited to the following:

- (1) Boiler and heater rooms
- (2) Laundries
- (3) Repair shops
- (4) Rooms or spaces used for storage of combustible supplies and equipment in quantities deemed hazardous by the authority having jurisdiction

33.3.3.3 Interior Finish. Interior wall and ceiling finish shall be Class A or Class B in accordance with Section 10.2. Interior floor finish in accordance with 10.2.7 shall be Class I or Class II in corridors and exits.

Exception: Previously installed floor coverings, subject to the approval of the authority having jurisdiction.

33.3.3.4 Detection, Alarm, and Communications Systems.

33.3.3.4.1 General. A fire alarm system in accordance with Section 9.6 shall be provided.

Exception: Where each sleeping room has exterior exit access in accordance with 7.5.3 and the building is not more than three stories in height.

33.3.3.4.2 Initiation. The required fire alarm system shall be initiated by the following means:

- (1) Manual means in accordance with 9.6.2

Exception: A manual means, as specified in 9.6.2, in excess of the manual fire alarm box at a constantly attended location per 33.3.3.4.2(2) below shall not be required where there are other effective means (such as a complete automatic sprinkler or automatic detection system) for notification of fire as required.

- (2) A manual fire alarm box located at a convenient central control point under continuous supervision of responsible employees

- (3) Any automatic sprinkler system

Exception: Automatic sprinkler systems that are not required by another section of this Code shall not be required to initiate the fire alarm system.

- (4) Any required detection system

Exception: Sleeping room smoke alarms shall not be required to initiate the building fire alarm system.

33.3.3.4.3 (Reserved.)

33.3.3.4.4 Occupant Notification. Occupant notification shall be provided automatically, without delay, by internal audible alarm in accordance with 9.6.3.

33.3.3.4.5 (Reserved.)

33.3.3.4.6* Fire Department Notification. In case of a fire, provisions shall be made for the immediate notification of the public fire department by either telephone or other means. Where there is no public fire department, this notification shall be made to the private fire brigade.

33.3.3.4.7 Smoke Alarms. Each sleeping room shall be provided with an approved smoke alarm in accordance with 9.6.2.10 that is powered from the building electrical system.

Exception No. 1: Existing battery-powered smoke alarms, rather than building electrical service-powered smoke alarms, shall be accepted where, in the opinion of the authority having jurisdiction, the facility has demonstrated that testing, maintenance, and battery replacement programs ensure the reliability of power to the smoke alarms.

Exception No. 2: Facilities having an existing corridor smoke detection system in accordance with Section 9.6 that is connected to the building fire alarm system.

33.3.3.4.8 Smoke Detection Systems. All living areas as defined in 3.3.119 and corridors shall be provided with smoke detectors in accordance with NFPA 72, *National Fire Alarm Code*, that are arranged to initiate an alarm that is audible in all sleeping areas.

Exception No. 1: Detectors shall not be required in living areas and kitchens in facilities protected throughout by an approved automatic sprinkler system installed in accordance with 33.3.3.5.

Exception No. 2: Unenclosed corridors, passageways, balconies, colonnades, or other arrangements with one or more sides along the long dimension fully or extensively open to the exterior at all times.

33.3.3.5 Extinguishment Requirements.

33.3.3.5.1* Automatic Extinguishment Systems. Where an automatic sprinkler system is installed either for total or partial building coverage, the system shall be installed in accordance with Section 9.7.

Exception No. 1: In buildings not more than four stories in height, a sprinkler system complying with NFPA 13R, *Standard for Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height*, shall be permitted.

Exception No. 2: Automatic sprinklers shall not be required in closets not exceeding 24 ft² (2.2 m²) and in bathrooms not exceeding 55 ft² (5.1 m²), provided that such spaces are finished with lath and plaster or materials with a 15-minute thermal barrier.

Exception No. 3: Initiation of the fire alarm system shall not be required for existing installations in accordance with 33.3.3.5.4.

33.3.3.5.2 All high-rise buildings shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7. Such systems shall initiate the fire alarm system in accordance with Section 9.6.

Exception: Automatic sprinklers shall not be required in small clothes closets where the smallest dimension does not exceed 3 ft (0.9 m), the area does not exceed 24 ft² (2.2 m²), and the walls and ceiling are finished with noncombustible or limited-combustible materials.

33.3.3.5.3 Automatic sprinkler systems shall be supervised in accordance with Section 9.7. Waterflow alarms shall not be required to be transmitted off-site.

33.3.3.5.4 Sprinkler piping serving not more than six sprinklers for any isolated hazardous area in accordance with 9.7.1.2 shall be permitted. In new installations where more than two sprinklers are installed in a single area, waterflow detection shall be provided to initiate the fire alarm system required by 33.3.3.4.1.

33.3.3.5.5 Portable Fire Extinguishers. Portable fire extinguishers in accordance with 9.7.4.1 shall be provided near hazardous areas.

33.3.3.6 Corridors and Separation of Sleeping Rooms.

33.3.3.6.1 Access shall be provided from every resident use area to not less than one means of egress that is separated from all other rooms or spaces by walls complying with 33.3.3.6.3 through 33.3.3.6.6.

Exception No. 1: Rooms or spaces, other than sleeping rooms, protected throughout by an approved automatic sprinkler system in accordance with 33.3.3.5.

Exception No. 2: Prompt evacuation capability facilities in buildings not over two stories in height where not less than one required means of egress from each sleeping room provides a path of travel to the outside without traversing any corridor or other spaces exposed to unprotected vertical openings, living areas, and kitchens.

Exception No. 3: Rooms or spaces, other than sleeping rooms, provided with a smoke detection and alarm system connected to activate the building evacuation alarm. Furnishings, finishes, and furniture, in combination with all other combustibles within the spaces, shall be of minimum quantity and arranged so that a fully developed fire is unlikely to occur.

33.3.3.6.2 Sleeping rooms shall be separated from corridors, living areas, and kitchens by walls complying with 33.3.3.6.3 through 33.3.3.6.6.

33.3.3.6.3 Walls required by 33.3.3.6.1 or 33.3.3.6.2 shall have a fire resistance rating of not less than 1/2 hour.

Exception No. 1: In buildings protected throughout by an approved automatic sprinkler system in accordance with 33.3.3.5, walls shall be smoke partitions in accordance with 8.2.4. The provisions of 8.2.4.3.5 shall not apply.

Exception No. 2: In buildings not more than two stories in height that are classified as prompt evacuation capability and that house not more than 30 residents, walls shall be smoke partitions in accordance with 8.2.4. The provisions of 8.2.4.3.5 shall not apply.

33.3.3.6.4 Doors in walls required by 33.3.3.6.1 or 33.3.3.6.2 shall have a fire protection rating of not less than 20 minutes.

Exception No. 1: Solid-bonded wood core doors of not less than 1 3/4 in. (4.4 cm) thickness shall be permitted to continue to be used.

Exception No. 2: In buildings protected throughout by an approved automatic sprinkler system in accordance with 33.3.3.5, doors that are nonrated shall be permitted to continue to be used.

Exception No. 3: Where automatic sprinkler protection is provided in the corridor in accordance with 31.3.5.2 through 31.3.5.4, doors shall not be required to have a fire protection rating but shall be in accordance with 8.2.4.3. The provisions of 8.2.4.3.5 shall not apply. Doors shall be equipped with latches for keeping the doors tightly closed.

33.3.3.6.5 Walls and doors required by 33.3.3.6.1 and 33.3.3.6.2 shall be constructed as smoke partitions in accordance with 8.2.4. The provisions of 8.2.4.3.5 shall not apply. No louvers, transfer grilles, operable transoms, or other air passages shall penetrate such walls or doors, except properly installed heating and utility installations.

33.3.3.6.6 Doors in walls required by 33.3.3.6.1 and 33.3.3.6.2 shall be self-closing or automatic-closing in accordance with 7.2.1.8. Doors in walls separating sleeping rooms from corridors shall be automatic-closing in accordance with 7.2.1.8.

Exception No. 1: Doors to sleeping rooms that have occupant-control locks such that access is normally restricted to the occupants or staff personnel shall be permitted to be self-closing.

Exception No. 2: In buildings protected throughout by an approved automatic sprinkler system installed in accordance with 33.3.3.5, doors, other than doors to hazardous areas, vertical openings, and exit enclosures, shall not be required to be self-closing or automatic-closing.

33.3.3.7 Subdivision of Building Spaces. Every sleeping room floor shall be divided into not less than two smoke compartments of approximately the same size, with smoke barriers in accordance with Section 8.3. Smoke dampers shall not be required.

Additional smoke barriers shall be provided such that the travel distance from a sleeping room corridor door to a smoke barrier shall not exceed 150 ft (45 m).

Exception No. 1: Buildings protected throughout by an approved automatic sprinkler system installed in accordance with 33.3.3.5.

Exception No. 2: Where each sleeping room is provided with exterior ways of exit access arranged in accordance with 7.5.3.

Exception No. 3: Smoke barriers shall not be required where the aggregate corridor length on each floor is not more than 150 ft (45 m).

33.3.4 Special Provisions. (Reserved.)

33.3.5 (Reserved.)

33.3.6 Building Services.

33.3.6.1 Utilities. Utilities shall comply with the provisions of Section 9.1.

33.3.6.2 Heating, Ventilating, and Air Conditioning.

33.3.6.2.1 Heating, ventilating, and air conditioning equipment shall comply with the provisions of Section 9.2.

33.3.6.2.2 No stove or combustion heater shall be located to block escape in case of fire caused by the malfunction of the stove or heater.

33.3.6.2.3 Unvented fuel-fired heaters shall not be used in any board and care occupancy.

33.3.6.3 Elevators, Dumbwaiters, and Vertical Conveyors. Elevators, dumbwaiters, and vertical conveyors shall comply with the provisions of Section 9.4.

33.3.6.4 Rubbish Chutes, Incinerators, and Laundry Chutes. Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 9.5.

SECTION 33.4* SUITABILITY OF AN APARTMENT BUILDING TO HOUSE A BOARD AND CARE OCCUPANCY

33.4.1 General.

33.4.1.1 Scope. Section 33.4 applies to apartment buildings that have one or more individual apartments used as a board and care occupancy. Section 33.4 determines the suitability of such buildings to house a residential board and care facility. The suitability of such buildings for apartments not used for board and care occupancies is covered in Chapter 31.

33.4.1.2 Requirements for individual apartments used as residential board and care occupancies shall be as specified in Section 33.2. Egress from the apartment into the common building corridor shall be considered acceptable egress from the board and care facility.

33.4.1.3 Requirements Based on Evacuation Capability.

33.4.1.3.1 Apartment buildings housing board and care facilities shall comply with the requirements of Section 33.4.

Exception. Facilities where the authority having jurisdiction has determined that equivalent safety for housing a residential board and care facility is provided in accordance with Section 1.5.*

33.4.1.3.2 All facilities shall meet the requirements of Chapter 31 and the additional requirements of Section 33.4.

33.4.1.4 Minimum Construction Requirements. In addition to the requirements of Chapter 31, apartment buildings housing residential board and care facilities for groups classified as prompt or slow evacuation capability shall meet the construction requirements of 33.3.1.3, and those for groups classified as impractical evacuation capability shall meet the construction requirements of 19.1.6. In applying the construction requirements, the height shall be determined by the height of the residential board and care facility measured above the primary level of exit discharge.

33.4.2 Means of Egress. The requirements of Section 31.2 shall apply only to the parts of means of egress serving the apartment(s) used as a residential board and care occupancy.

33.4.3 Protection.

33.4.3.1 Interior Finish. The requirements of 31.3.3 shall apply only to the parts of means of egress serving the apartment(s) used as a residential board and care occupancy.

33.4.3.2 Construction of Corridor Walls. The requirements of 31.3.6 shall apply only to corridors serving the residential board and care facility, including that portion of the corridor wall separating the residential board and care facility from the common corridor.

33.4.3.3 Subdivision of Building Spaces. The requirements of 31.3.7 shall apply to those stories with an apartment(s) used as a residential board and care occupancy.

SECTION 33.5 RESERVED**SECTION 33.6 RESERVED****SECTION 33.7 OPERATING FEATURES**

33.7.1 Emergency Plan. The administration of every residential board and care facility shall have, in effect and available to all supervisory personnel, written copies of a plan for protecting all persons in the event of fire, for keeping persons in place, for evacuating persons to areas of refuge, and for evacuating persons from the building when necessary. The plan shall include special staff response, including the fire protection procedures needed to ensure the safety of any resident, and shall be amended or revised whenever any resident with unusual needs is admitted to the home. All employees shall be periodically instructed and kept informed with respect to their duties and responsibilities under the plan. Such instruction shall be reviewed by the staff not less than every 2 months. A copy of the plan shall be readily available at all times within the facility.

33.7.2 Resident Training. All residents participating in the emergency plan shall be trained in the proper actions to be taken in the event of fire. This training shall include actions to be taken if the primary escape route is blocked. If the resident is given rehabilitation or habilitation training, training in fire prevention and the actions to be taken in the event of a fire shall be a part of the training program. Residents shall be trained to assist each other in case of fire to the extent that their physical and mental abilities permit them to do so without additional personal risk.

33.7.3 Emergency Egress and Relocation Drills. Emergency egress and relocation drills shall be conducted not less than six times per year on a bimonthly basis, with not less than two drills conducted during the night when residents are sleeping. The drills shall be permitted to be announced in advance to the residents. The drills shall involve the actual evacuation of all residents to an assembly point as specified in the emergency plan and shall provide residents with experience in egressing through all exits and means of escape required by this *Code*. Exits and means of escape not used in any drill shall not be credited in meeting the requirements of this *Code* for board and care facilities.

Exception No. 1: Actual exiting from windows shall not be required to comply with 33.7.3; opening the window and signaling for help shall be an acceptable alternative.

Exception No. 2: If the board and care facility has an evacuation capability classification of impractical, those residents who cannot meaningfully assist in their own evacuation or who have special health problems shall not be required to actively participate in the drill. Section 19.7 shall apply in such instances.

33.7.4 Smoking.

33.7.4.1* Smoking regulations shall be adopted by the administration of board and care occupancies.

33.7.4.2 Where smoking is permitted, noncombustible safety-type ashtrays or receptacles shall be provided in convenient locations.

33.7.5* Furnishings, Bedding, and Decorations.

33.7.5.1 New draperies, curtains, and other similar loosely hanging furnishings and decorations in board and care facilities shall be in accordance with the provisions of 10.3.1.

33.7.5.2* New upholstered furniture within board and care facilities shall be tested in accordance with the provisions of 10.3.2(1) and 10.3.3.

Exception: Upholstered furniture belonging to the resident in sleeping rooms, provided that a smoke alarm is installed in such rooms. Battery-powered single-station smoke alarms shall be permitted.

33.7.5.3* New mattresses within board and care facilities shall be tested in accordance with the provisions of 10.3.2(3) and 10.3.4.

Exception: Mattresses belonging to the resident in sleeping rooms, provided that a smoke alarm is installed in such rooms. Battery-powered single-station smoke alarms shall be permitted.

Chapter 34 RESERVED**Chapter 35 RESERVED****Chapter 36 NEW MERCANTILE OCCUPANCIES****SECTION 36.1 GENERAL REQUIREMENTS****36.1.1 Application.**

36.1.1.1 The requirements of this chapter apply to the following:

- (1) New buildings or portions thereof used as mercantile occupancies (*see 1.4.1*)
- (2) Additions made to, or used as, a mercantile occupancy (*see 4.6.6 and 36.1.1.3*)
- (3) Alterations, modernizations, or renovations of existing mercantile occupancies (*see 4.6.7*)
- (4) Existing buildings or portions thereof upon change of occupancy to a mercantile occupancy (*see 4.6.11*)

36.1.1.2 This chapter establishes life safety requirements for all new mercantile buildings. Specific requirements for sub-occupancy groups such as Class A, Class B, and Class C mercantile occupancies; covered malls; and bulk merchandising retail buildings are contained in paragraphs pertaining thereto.

36.1.1.3 Additions to existing buildings shall conform to the requirements for new construction. Existing portions of the structure are not required to be modified, provided that the new construction has not diminished the fire safety features of the facility. Existing portions shall be upgraded if the addition results in a change of mercantile subclassification. (*See 36.1.4.2.*)

36.1.1.4 When a mercantile occupancy changes from Class C to Class A or Class B, or from Class B to Class A, the provisions of this chapter shall apply.

36.1.2 Mixed Occupancies.

36.1.2.1 Mixed occupancies shall comply with 6.1.14.

36.1.2.2 Combined Mercantile Occupancies and Parking Structures. Walls separating parking structures from mercantile occupancies shall have a fire resistance rating of not less than 2 hours.

Exception: In enclosed parking structures that are protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, or in open-air parking structures, nonrated glazing and nonrated opening protectives shall be permitted if all of the following conditions are met:

(a) *The openings do not exceed 25 percent of the area of the wall in which they are located.*

(b) *The openings are used as the main entrance and for associated sidelight functions.*

(c) *The enclosed connecting mercantile building is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.*

(d) *The floor elevation of the mercantile occupancy is not less than 4 in. (10.2 cm) above the floor level of the parking structure.*

(e) *No vehicle is able to park or drive within 10 ft (3 m) of the openings.*

(f) *The openings are protected by not less than a glass membrane.*

(g) *Any doors in the glass membrane are self-closing.*

36.1.3 Special Definitions.

Anchor Store. See 3.3.11.

Bulk Merchandising Retail Building. See 3.3.26.

Gross Leasable Area. See 3.3.92.

Open-Air Mercantile Operation. See 3.3.138.

36.1.4 Classification of Occupancy.

36.1.4.1 Mercantile occupancies shall include all buildings and structures or parts thereof with occupancy as defined in 6.1.10.

36.1.4.2 Subclassification of Occupancy.

36.1.4.2.1 Mercantile occupancies shall be subclassified as follows.

(a) *Class A.* All mercantile occupancies having an aggregate gross area of more than 30,000 ft² (2800 m²) or using more than three levels, excluding mezzanines, for sales purposes.

(b) *Class B.* All mercantile occupancies of more than 3000 ft² (280 m²) but not more than 30,000 ft² (2800 m²) aggregate gross area, or using floors above or below the street floor level for sales purposes (mezzanines permitted). (*See 36.1.4.2.3.*)

Exception: If more than three floors, excluding mezzanines, are used, the mercantile occupancy shall be Class A, regardless of area.

(c) *Class C.* All mercantile occupancies of not more than 3000 ft² (280 m²) gross area used for sales purposes on one story only, excluding mezzanines.

36.1.4.2.2 For the purpose of the classification required in 36.1.4.2.1, the aggregate gross area shall be the total gross area of all floors used for mercantile purposes. Where a mercantile occupancy is divided into sections, regardless of fire separation, the aggregate gross area shall include the area of all sections used for sales purposes. Areas of floors not used for sales purposes, such as an area used only for storage and not open to the public, shall not be counted for the purposes of the classifications in 36.1.4.2.1(a) through (c). However, means of egress shall be provided for such nonsales areas in accordance with their occupancy as specified by other chapters of this *Code*.

36.1.4.2.3 Mezzanines shall comply with 8.2.6.

36.1.4.2.4 Where a number of tenant spaces under different management are located in the same building, the aggregate gross area (*see 36.1.4.2.2*) of all such tenant spaces shall be used in determining classification per 36.1.4.2.1.

Exception No. 1: Covered mall buildings. (See 36.4.4.)

Exception No. 2: Where individual tenant spaces are separated by fire barriers with a 2-hour fire resistance rating.

Exception No. 3: Where tenant spaces are separated by fire barriers with a 1-hour fire resistance rating and the building is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

36.1.5 Classification of Hazard of Contents.

36.1.5.1 The contents of mercantile occupancies shall be classified as ordinary hazard in accordance with Section 6.2, except as modified by 36.1.5.2.

36.1.5.2 Mercantile occupancies shall be classified as high hazard if high hazard commodities are displayed or handled without protective wrappings or containers, in which case the following additional provisions shall apply:

- (1) Exits shall be located so that not more than 75 ft (23 m) of travel from any point is needed to reach the nearest exit.
- (2) From every point, there shall be not less than two exits accessible by travel in different directions (no common path of travel).
- (3) All vertical openings shall be enclosed.

36.1.6 Minimum Construction Requirements. (No special requirements.)

36.1.7 Occupant Load. The occupant load, in number of persons for whom means of egress and other provisions are required, shall be determined on the basis of the occupant load factors of Table 7.3.1.2 that are characteristic of the use of the space or shall be determined as the maximum probable population of the space under consideration, whichever is greater.

SECTION 36.2 MEANS OF EGRESS REQUIREMENTS

36.2.1 General.

36.2.1.1 All means of egress shall be in accordance with Chapter 7 and this chapter.

36.2.1.2 No inside open stairway or inside open ramp shall be permitted to serve as a component of the required means of egress system for more than one floor.

36.2.1.3 Where there are two or more floors below the street floor, the same stair or other exit shall be permitted to serve all floors, but all required exits from such areas shall be independent of any open stairways between the street floor and the floor below it.

36.2.1.4 Where a level, outside exit from upper floors is possible owing to hills, such outside exits shall be permitted to serve instead of horizontal exits. If, however, such outside exits from the upper floor also serve as an entrance from a principal street, the upper floor shall be classified as a street floor in accordance with the definition of *street floor* in 3.3.196 and shall be subject to the requirements of this chapter for street floors.

36.2.1.5 For special considerations for high hazard contents, see 36.1.5.2.

36.2.2 Means of Egress Components.

36.2.2.1 Components of means of egress shall be limited to the types described in 36.2.2.2 through 36.2.2.12.

36.2.2.2 Doors.

36.2.2.2.1 Doors complying with 7.2.1 shall be permitted.

36.2.2.2.2* Locks complying with Exception No. 2 to 7.2.1.5.1 shall be permitted only on principal entrance/exit doors.

36.2.2.2.3 (Reserved.)

36.2.2.2.4 Delayed-egress locks complying with 7.2.1.6.1 shall be permitted.

36.2.2.2.5 Access-controlled egress doors complying with 7.2.1.6.2 shall be permitted in buildings protected throughout by an approved, supervised fire detection system in accordance with Section 9.6 or an approved automatic sprinkler system in accordance with Section 9.7.

36.2.2.2.6 Where horizontal or vertical security grilles or doors are used as a part of the required means of egress from a tenant space, such grilles or doors shall comply with Exception No. 2 to 7.2.1.4.1.

36.2.2.2.7 All doors at the foot of stairs from upper floors or at the head of stairs leading to floors below the street floor shall swing in the direction of egress travel.

36.2.2.2.8 Revolving doors complying with 7.2.1.10 shall be permitted.

36.2.2.3 Stairs.

36.2.2.3.1 Stairs complying with 7.2.2 shall be permitted.

36.2.2.3.2 Spiral stairs complying with 7.2.2.2.3 shall be permitted.

36.2.2.4 Smokeproof Enclosures. Smokeproof enclosures complying with 7.2.3 shall be permitted.

36.2.2.5 Horizontal Exits. Horizontal exits complying with 7.2.4 shall be permitted.

36.2.2.6 Ramps. Ramps complying with 7.2.5 shall be permitted.

36.2.2.7 Exit Passageways. Exit passageways complying with 7.2.6 shall be permitted.

*Exception:** In lieu of the provisions of 7.2.6.4, an exit passageway in a covered mall building shall be permitted to accommodate the following independently:

(a) The portion of the occupant load assigned to the exit passageway from only the covered mall/pedestrian way

(b) The largest occupant load assigned to the exit passageway from a single tenant space

36.2.2.8 (Reserved.)

36.2.2.9 (Reserved.)

36.2.2.10 Fire Escape Ladders. Fire escape ladders complying with 7.2.9 shall be permitted.

36.2.2.11 Alternating Tread Devices. Alternating tread devices complying with 7.2.11 shall be permitted.

36.2.2.12 Areas of Refuge. Areas of refuge complying with 7.2.12 shall be permitted.

Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, two rooms or spaces separated from each other by smoke-resistant partitions in accordance with the definition of area of refuge in 3.3.14 shall not be required.

36.2.3 Capacity of Means of Egress.

36.2.3.1 The capacity of means of egress shall be in accordance with Section 7.3.

36.2.3.2 In Class A and Class B mercantile occupancies, street floor exits shall be sufficient for the occupant load of the street floor plus the required capacity of stairs and ramps discharging through the street floor.

36.2.4 Number of Exits. Not less than two separate exits shall meet the following criteria (*see also Section 7.4*):

- (1) They shall be provided on every story.
- (2) They shall be accessible from every part of every story or mezzanine.

Exception No. 1: Exit access travel shall be permitted to be common for the distances permitted as common paths of travel by 36.2.5.3.

Exception No. 2: A single means of egress shall be permitted in a Class C mercantile occupancy, provided that one of the following conditions is met:

(a) The travel distance to the exit or to a covered mall (if it is considered a pedestrian way) does not exceed 75 ft (23 m).

(b) The travel distance to the exit or to a covered mall (if it is considered a pedestrian way) does not exceed 100 ft (30 m), and the story on which the occupancy is located and all communicating levels that are traversed to reach the exit or covered mall are protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

Exception No. 3: A single means of egress to an exit or to a covered mall (if it is considered a pedestrian way) shall be permitted from a mezzanine within any Class A, Class B, or Class C mercantile occupancy, provided that the common path of travel does not exceed 75 ft (23 m), or does not exceed 100 ft (30 m) if protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

36.2.5 Arrangement of Means of Egress.

36.2.5.1 Means of egress shall be arranged in accordance with Section 7.5.

36.2.5.2 Dead-end corridors shall not exceed 20 ft (6.1 m).

Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, dead-end corridors shall not exceed 50 ft (15 m).

36.2.5.3 Common paths of travel shall not exceed 75 ft (23 m).

Exception: A common path of travel shall be permitted for the first 100 ft (30 m) in a building protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

36.2.5.4 Aisles leading to each exit shall be required. The aggregate width of such aisles shall be not less than the required width of the exit.

36.2.5.5 Required aisles shall be not less than 36 in. (91 cm) in clear width.

36.2.5.6 In Class A mercantile occupancies, not less than one aisle of a 5-ft (1.5-m) minimum width shall lead directly to an exit.

36.2.5.7 If the only means of customer entrance is through one exterior wall of the building, two-thirds of the required egress width shall be located in such wall.

Exception: Bulk merchandising retail buildings. (See 36.4.5.2.)

36.2.5.8 Not less than one-half of the required exits shall be located so as to be reached without passing through checkout stands. In no case shall checkout stands or associated railings or barriers obstruct exits, required aisles, or approaches thereto.

36.2.5.9* Where wheeled carts or buggies are used by customers, adequate provision shall be made for the transit and parking of such carts to minimize the possibility that they might obstruct means of egress.

36.2.5.10 Exit access in Class A and Class B mercantile occupancies that are protected throughout by an approved, supervised automatic sprinkler system and exit access in all Class C mercantile occupancies shall be permitted to pass through storerooms, provided that the following conditions are met:

- (1) Not more than 50 percent of exit access shall be provided through the storeroom.
- (2) The storeroom shall not be subject to locking.
- (3) The main aisle through the storeroom shall be not less than 44 in. (112 cm) wide.
- (4) The path of travel through the storeroom, defined with fixed barriers, shall be direct and continuously maintained in an unobstructed condition.

36.2.6 Travel Distance to Exits. Travel distance to exits, measured in accordance with Section 7.6, shall not exceed 100 ft (30 m).

Exception: Travel distance shall not exceed 200 ft (60 m) in buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

36.2.7 Discharge from Exits.

36.2.7.1 Exit discharge shall comply with Section 7.7 and 36.2.7.2.

36.2.7.2* Fifty percent of the exits shall be permitted to discharge through the level of exit discharge in accordance with 7.7.2 only where the building is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, and the distance of travel from the termination of the exit enclosure to an outside street door shall not exceed 50 ft (15 m).

36.2.8 Illumination of Means of Egress. Means of egress shall be illuminated in accordance with Section 7.8.

36.2.9 Emergency Lighting. Class A and Class B mercantile occupancies and covered mall buildings shall have emergency lighting facilities in accordance with Section 7.9.

36.2.10 Marking of Means of Egress. Means of egress shall have signs in accordance with Section 7.10.

Exception: Where an exit is immediately apparent from all portions of the sales area, the exit marking shall not be required.

36.2.11 Special Means of Egress Features. (Reserved.)

SECTION 36.3 PROTECTION

36.3.1 Protection of Vertical Openings. Any vertical opening shall be enclosed or protected in accordance with 8.2.5.

Exception No. 1: In Class A or Class B mercantile occupancies protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, unprotected vertical openings shall be permitted at one of the following locations:

(a) Between any two floors

(b) Among the street floor, the first adjacent floor below, and the first adjacent floor (or mezzanines) above

Exception No. 2: In Class C mercantile occupancies, unprotected openings shall be permitted between the street floor and the mezzanine.

Exception No. 3: In Class A or Class B mercantile occupancies protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, unenclosed openings in accordance with 8.2.5.5 shall be permitted.

36.3.2 Protection from Hazards.

36.3.2.1* Hazardous areas including, but not limited to, areas used for general storage, boiler or furnace rooms, and maintenance shops that include woodworking and painting areas shall be protected in accordance with Section 8.4.

Exception: In general storage and stock areas protected by an automatic extinguishing system in accordance with Section 9.7, an enclosure, if provided, shall be exempt from the provisions of 8.4.1.2.

36.3.2.2* High hazard contents areas, as classified in Section 6.2, shall meet the following criteria:

- (1) The area shall be separated from other parts of the building by fire barriers having a fire resistance rating of not less than 1 hour, with all openings therein protected by $3/4$ -hour fire protection-rated self-closing fire doors.
- (2) The area shall be protected by an automatic extinguishing system in accordance with Section 9.7.

36.3.3 Interior Finish.

36.3.3.1 Interior finish shall be in accordance with Section 10.2.

36.3.3.2 Interior Wall and Ceiling Finish. Interior wall and ceiling finish complying with 10.2.3 shall be Class A or Class B.

36.3.3.3 Interior Floor Finish. (No requirements.)

36.3.4 Detection, Alarm, and Communications Systems.

36.3.4.1 General. Class A mercantile occupancies shall be provided with a fire alarm system in accordance with Section 9.6.

36.3.4.2 Initiation. Initiation of the required fire alarm system shall be by manual means per 9.6.2.1(1).

Exception No. 1: Initiation shall be permitted to be by means of an approved automatic fire detection system in accordance with 9.6.2.1(2) that provides protection throughout the building.

Exception No. 2: Initiation shall be permitted to be by means of an approved automatic sprinkler system in accordance with 9.6.2.1(3) that provides protection throughout the building.

36.3.4.3 Notification.

36.3.4.3.1 Occupant Notification. During all times that the mercantile occupancy is occupied (*see 7.2.1.1.3*), the required fire alarm system, once initiated, shall perform one of the following functions.

- (a) It shall activate a general alarm in accordance with 9.6.3 throughout the mercantile occupancy.

Exception: Positive alarm sequence in accordance with 9.6.3.4 shall be permitted.

- (b) It shall activate an alarm signal in a continuously attended location for the purpose of initiating emergency action by personnel trained to respond to emergencies. Emergency action shall be initiated by means of live voice public address system announcements originating from the attended location where the alarm signal is received. The system shall be permitted to be used for other announcements, provided that the fire alarm use takes precedence over any other use.

Exception: Any other occupant notification means permitted by 9.6.3 shall be permitted in lieu of live voice public address system announcements.

36.3.4.3.2 Emergency Forces Notification. Emergency forces notification shall be provided and shall include notifying the following:

- (1) The fire department in accordance with 9.6.4
- (2) The local emergency organization, if provided

36.3.5 Extinguishment Requirements.

36.3.5.1 Mercantile occupancies shall be protected by an approved automatic sprinkler system in accordance with Section 9.7 as follows:

- (1) Throughout all mercantile occupancies three or more stories in height
- (2) Throughout all mercantile occupancies exceeding 12,000 ft² (1115 m²) in gross area
- (3) Throughout stories below the level of exit discharge where such stories have an area exceeding 2500 ft² (230 m²) used for the sale, storage, or handling of combustible goods and merchandise
- (4) Throughout mixed occupancies in accordance with 6.1.14 where the conditions of 36.3.5.1(1), (2), or (3) apply to the mercantile occupancy

36.3.5.2 Automatic sprinkler systems in Class A mercantile occupancies shall be supervised in accordance with 9.7.2.

36.3.5.3 Portable fire extinguishers shall be provided in all mercantile occupancies in accordance with 9.7.4.1.

36.3.6 Corridors.

36.3.6.1* Where access to exits is provided by corridors, such corridors shall be separated from use areas by walls having a fire resistance rating of not less than 1 hour in accordance with 8.2.3.

Exception No. 1: Where exits are available from an open floor area.

Exception No. 2: Within a space occupied by a single tenant.

Exception No. 3: Within buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

36.3.6.2 Openings in corridor walls required by 36.3.6.1 to have a fire resistance rating shall be protected in accordance with 8.2.3.

36.3.7 Subdivision of Building Spaces. (No special requirements.)

36.3.8 Special Protection Features. Nonrated glazing and nonrated opening protectives per the exception to 36.1.2.2 shall be permitted between mercantile occupancies and parking structures.

SECTION 36.4 SPECIAL PROVISIONS

36.4.1 Windowless or Underground Buildings. (*See Section 11.7.*)

36.4.2 High-Rise Buildings. High-rise buildings shall comply with the automatic sprinkler requirements of 11.8.2.1.

36.4.3 Open-Air Mercantile Operations.

36.4.3.1 Open-air mercantile operations, such as open-air markets, gasoline filling stations, roadside stands for the sale of farm produce, and other outdoor mercantile operations shall be arranged and conducted to maintain free and unobstructed ways of travel at all times. Such ways of travel shall allow prompt escape from any point of danger in case of fire or other emergency, with no dead ends in which persons might be trapped due to display stands, adjoining buildings, fences, vehicles, or other obstructions.

36.4.3.2 If mercantile operations are conducted in roofed-over areas, they shall be treated as mercantile buildings, provided that canopies over individual small stands to protect

merchandise from the weather are not construed as constituting buildings for the purpose of this Code.

36.4.4 Covered Mall Buildings. The purpose of 36.4.4 is to establish minimum standards of life safety for covered mall buildings having not more than three levels. (See 3.3.25.3.)

36.4.4.1 The covered mall building shall be treated as a single building for the purpose of calculation of means of egress and shall be subject to the requirements for appropriate occupancies, except as modified by the provisions of 36.4.4. The covered mall shall be of a clear width not less than that needed to accommodate egress requirements as set forth in other sections of this Code.

Exception: The covered mall shall be permitted to be considered a pedestrian way, in which case the travel distance within a tenant space to an exit or to the covered mall shall not exceed 200 ft (60 m) (see 36.2.6, exception) or shall not exceed the maximum for the appropriate occupancy. An additional 200 ft (60 m) shall be permitted for travel through the covered mall space if all the following requirements are met.

(a) *The covered mall shall be of a clear width not less than that needed to accommodate egress requirements as set forth in other sections of this chapter but shall be not less than 20 ft (6.1 m) wide in its narrowest dimension.*

(b)* *On each side of the mall floor area, the covered mall shall be provided with an unobstructed exit access of not less than 10 ft (3 m) in clear width parallel to and adjacent to the mall tenant front. Such exit access shall lead to an exit having a width of not less than 66 in. (168 cm). (See 36.4.4.2.)*

(c) *The covered mall and all buildings connected thereto shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7. The system shall be installed in such a manner that any portion of the system serving tenant spaces can be taken out of service without affecting the operation of the portion of the system serving the covered mall.*

(d) *Walls dividing tenant spaces from each other shall extend from the floor to the underside of the roof deck, floor deck above, or ceiling where the ceiling is constructed to limit the transfer of smoke. Where the tenant areas are provided with an engineered smoke control system, walls shall not be required to divide tenant spaces from each other. No separation shall be required between a tenant space and the covered mall.*

(e)* *The covered mall shall be provided with a smoke control system.*

36.4.4.2 Means of Egress Details.

36.4.4.2.1 Every floor of a covered mall shall be provided with the number of means of egress specified by Section 7.4, with not less than two means of egress remotely located from each other.

36.4.4.2.2 Class A and Class B mercantile occupancies connected to a covered mall shall be provided with the number of means of egress required by Section 7.4, with not less than two means of egress remotely located from one another.

36.4.4.2.3* Each individual anchor store shall have means of egress independent of the covered mall.

36.4.4.2.4 Every covered mall shall be provided with unobstructed exit access parallel to and adjacent to the mall tenant fronts. This exit access shall extend to each mall exit.

36.4.4.2.5* Rooms housing building service equipment, janitor closets, and service elevators shall be permitted to open directly onto exit passageways, provided that the following criteria are met:

- (1) The required fire resistance rating between such rooms or areas and the exit passageway is maintained in accordance with 7.1.3.2.
- (2) Such rooms or areas are protected by an approved, supervised automatic sprinkler system in accordance with Section 9.7; however, the exceptions in NFPA 13, *Standard for the Installation of Sprinkler Systems*, that permit the omission of sprinklers from such rooms are not permitted.
- (3) Service elevators opening into the exit passageway shall not open into areas other than exit passageways.
- (4) Where exit stair enclosures discharge into the exit passageway, the provisions of 7.2.1.5.2 shall apply regardless of the number of stories served.

36.4.4.2.6 Emergency Lighting. (See 36.2.9.)

36.4.4.3 Detection, Alarm, and Communications Systems.

36.4.4.3.1 General. Covered malls shall be provided with a fire alarm system in accordance with Section 9.6.

36.4.4.3.2 Initiation. Initiation of the required fire alarm system shall be by means of the required automatic sprinkler system in accordance with 9.6.2.1(3).

36.4.4.3.3 Notification.

36.4.4.3.3.1 Occupant Notification. During all times that the covered mall is occupied (see 7.2.1.1.3), the required fire alarm system, once initiated, shall perform one of the following functions.

(a) It shall activate a general alarm in accordance with 9.6.3 throughout the covered mall.

Exception: Positive alarm sequence in accordance with 9.6.3.4 shall be permitted.

(b) It shall activate an alarm signal in a continuously attended location for the purpose of initiating emergency action by personnel trained to respond to emergencies. Emergency action shall be initiated by means of live voice public address system announcements originating from the attended location where the alarm signal is received. The system shall be permitted to be used for other announcements, provided that the fire alarm use takes precedence over any other use.

Exception: Any other occupant notification means permitted by 9.6.3 shall be permitted in lieu of live voice public address system announcements.

36.4.4.3.3.2 Emergency Forces Notification. Emergency forces notification shall be provided and shall include notifying the following:

- (1) The fire department in accordance with 9.6.4
- (2) The local emergency organization, if provided

36.4.4.3.4 Emergency Control. The fire alarm system shall be arranged to automatically actuate smoke management or smoke control systems in accordance with 9.6.5.2(3).

36.4.5 Bulk Merchandising Retail Buildings. New bulk merchandising retail buildings exceeding 12,000 ft² (1100 m²) in area shall comply with the requirements of this chapter as modified by 36.4.5.1 through 36.4.5.6.

36.4.5.1 Minimum Construction Requirements. Bulk merchandising retail buildings shall have a distance of not less than 16 ft (4.9 m) from the floor to the ceiling, from the floor to the floor above, or from the floor to the roof of any story.

36.4.5.2 Means of Egress Requirements. All means of egress shall be in accordance with Chapter 7 and this chapter. Not less than 50 percent of the required egress capacity shall be located independent of the main entrance/exit doors.

36.4.5.3 Storage, Arrangement, Protection, and Quantities of Hazardous Commodities.

36.4.5.3.1 The storage, arrangement, protection, and quantities of hazardous commodities shall be in accordance with the applicable portions of the following:

- (1) NFPA 13, *Standard for the Installation of Sprinkler Systems*
- (2) NFPA 30, *Flammable and Combustible Liquids Code*
- (3) NFPA 30B, *Code for the Manufacture and Storage of Aerosol Products*
- (4) NFPA 230, *Standard for the Fire Protection of Storage*
- (5) NFPA 231D, *Standard for Storage of Rubber Tires*
- (6) NFPA 430, *Code for the Storage of Liquid and Solid Oxidizers*
- (7) NFPA 432, *Code for the Storage of Organic Peroxide Formulations*
- (8) NFPA 434, *Code for the Storage of Pesticides*

36.4.5.3.2* High hazard commodities without protective containers shall not be stored or displayed within 100 ft (30 m) of the main entrance/exit doors.

36.4.5.4 Detection, Alarm, and Communications Systems.

36.4.5.4.1 General. Bulk merchandising retail buildings shall be provided with a fire alarm system in accordance with Section 9.6.

36.4.5.4.2 Initiation. Initiation of the required fire alarm system shall be by means of the required approved automatic sprinkler system (*see 36.4.5.5*) in accordance with 9.6.2.1(3).

36.4.5.4.3 Occupant Notification. During all times that the building is occupied (*see 7.2.1.1.3*), the required fire alarm system, once initiated, shall perform one of the following functions.

(a) It shall activate a general alarm in accordance with 9.6.3 throughout the building.

Exception: Positive alarm sequence in accordance with 9.6.3.4 shall be permitted.

(b) It shall activate an alarm signal in a continuously attended location for the purpose of initiating emergency action by personnel trained to respond to emergencies. Emergency action shall be initiated by means of live voice public address system announcements originating from the attended location where the alarm signal is received. The system shall be permitted to be used for other announcements, provided that the fire alarm use takes precedence over any other use.

Exception: Any other occupant notification means permitted by 9.6.3 shall be permitted in lieu of live voice public address system announcements.

36.4.5.4.4 Emergency Forces Notification. Emergency forces notification shall be provided and shall include notifying the following:

- (1) The fire department in accordance with 9.6.4
- (2) The local emergency organization, if provided

36.4.5.5 Extinguishing Requirements. Bulk merchandising retail buildings shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7 and the applicable provisions of the following:

- (1) NFPA 13, *Standard for the Installation of Sprinkler Systems*
- (2) NFPA 30, *Flammable and Combustible Liquids Code*
- (3) NFPA 30B, *Code for the Manufacture and Storage of Aerosol Products*
- (4) NFPA 230, *Standard for the Fire Protection of Storage*
- (5) NFPA 231D, *Standard for Storage of Rubber Tires*

36.4.5.6 Emergency Plan and Employee Training. There shall be in effect an approved written plan for the emergency egress and relocation of occupants. All employees shall be instructed and periodically drilled with respect to their duties under the plan.

SECTION 36.5 BUILDING SERVICES

36.5.1 Utilities. Utilities shall comply with the provisions of Section 9.1.

36.5.2 Heating, Ventilating, and Air Conditioning. Heating, ventilating, and air conditioning equipment shall comply with the provisions of Section 9.2.

36.5.3 Elevators, Escalators, and Conveyors. Elevators, escalators, and conveyors shall comply with the provisions of Section 9.4.

36.5.4 Rubbish Chutes, Incinerators, and Laundry Chutes. Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 9.5.

SECTION 36.6 RESERVED

SECTION 36.7 OPERATING FEATURES

36.7.1 Drills. In every Class A or Class B mercantile occupancy, employees shall be periodically trained in accordance with Section 4.7.

36.7.2 Extinguisher Training. Employees of mercantile occupancies shall be periodically instructed in the use of portable fire extinguishers.

Chapter 37 EXISTING MERCANTILE OCCUPANCIES

SECTION 37.1 GENERAL REQUIREMENTS

37.1.1 Application.

37.1.1.1 The requirements of this chapter apply to existing buildings or portions thereof currently occupied as mercantile occupancies. (See also 36.1.1.1.)

37.1.1.2 This chapter establishes life safety requirements for all existing mercantile buildings. Specific requirements for suboccupancy groups such as Class A, Class B, and Class C mercantile occupancies; covered malls; and bulk merchandising retail buildings are contained in paragraphs pertaining thereto.

37.1.1.3 Additions to existing buildings shall conform to the requirements for new construction. Existing portions of the structure are not required to be modified, provided that the new construction has not diminished the fire safety features of the facility. Existing portions shall be upgraded if the addition results in a change of mercantile subclassification. (See 37.1.4.2.)

37.1.1.4 When a mercantile occupancy changes from Class A to Class B or Class C, or from Class B to Class C, the provisions of this chapter shall apply. When a mercantile occupancy changes from Class C to Class A or Class B, or from Class B to Class A, the provisions of Chapter 36 shall apply.

37.1.2 Mixed Occupancies.

37.1.2.1 Mixed occupancies shall comply with 6.1.14.

37.1.2.2 Combined Mercantile Occupancies and Parking Structures. Walls separating parking structures from mercantile occupancies shall have a fire resistance rating of not less than 2 hours.

Exception: In enclosed parking structures that are protected throughout by an approved automatic sprinkler system in accordance with Section 9.7, or in open-air parking structures, nonrated glazing and nonrated opening protectives shall be permitted if all of the following conditions are met:

(a) *The openings do not exceed 25 percent of the area of the wall in which they are located.*

(b) *The openings are used as the main entrance and for associated sidelight functions.*

(c) *The enclosed connecting mercantile building is protected throughout by an approved automatic sprinkler system in accordance with Section 9.7.*

(d) *The floor elevation of the mercantile occupancy is not less than 4 in. (10.2 cm) above the floor level of the parking structure.*

(e) *No vehicle is able to park or drive within 10 ft (3 m) of the openings.*

(f) *The openings are protected by not less than a glass membrane.*

(g) *Any doors in the glass membrane are self-closing.*

37.1.3 Special Definitions.

Anchor Store. See 3.3.11.

Bulk Merchandising Retail Building. See 3.3.26.

Gross Leasable Area. See 3.3.92.

Open-Air Mercantile Operation. See 3.3.138.

37.1.4 Classification of Occupancy.

37.1.4.1 Mercantile occupancies shall include all buildings and structures or parts thereof with occupancy as defined in 6.1.10.

37.1.4.2 Subclassification of Occupancy.

37.1.4.2.1 Mercantile occupancies shall be subclassified as follows.

(a) *Class A.* All mercantile occupancies having an aggregate gross area of more than 30,000 ft² (2800 m²) or using more than three levels, excluding mezzanines, for sales purposes.

(b) *Class B.* All mercantile occupancies of more than 3000 ft² (280 m²) but not more than 30,000 ft² (2800 m²) aggregate gross area, or using floors above or below the street floor level for sales purposes (mezzanines permitted). (See 37.1.4.2.3.)

Exception: If more than three floors, excluding mezzanines, are used, the mercantile occupancy shall be Class A, regardless of area.

(c) *Class C.* All mercantile occupancies of not more than 3000 ft² (280 m²) gross area used for sales purposes on one story only, excluding mezzanines.

37.1.4.2.2 For the purpose of the classification required in 37.1.4.2.1, the aggregate gross area shall be the total gross area of all floors used for mercantile purposes. Where a mercantile occupancy is divided into sections, regardless of fire separation, the aggregate gross area shall include the area of all sections used for sales purposes. Areas of floors not used for sales purposes, such as an area used only for storage and not open to the public, shall not be counted for the purposes of the classifications in 37.1.4.2.1 (a) through (c). However, means of egress shall be provided for such nonsales areas in accordance with their occupancy as specified by other chapters of this Code.

37.1.4.2.3 The floor area of a mezzanine, or the aggregate floor area of multiple mezzanines, shall not exceed one-half of the floor area of the room or story in which the mezzanines are located. A mezzanine or aggregated mezzanines that exceed the one-half area limitation shall be treated as floors.

37.1.4.2.4 Where a number of tenant spaces under different management are located in the same building, the aggregate gross area (see 37.1.4.2.2) of all such tenant spaces shall be used in determining classification per 37.1.4.2.1.

Exception No. 1: Covered mall buildings. (See 37.4.4.)

Exception No. 2: Where individual tenant spaces are separated by fire barriers with a 1-hour fire resistance rating.

37.1.5 Classification of Hazard of Contents.

37.1.5.1 The contents of mercantile occupancies shall be classified as ordinary hazard in accordance with Section 6.2, except as modified by 37.1.5.2.

37.1.5.2 Mercantile occupancies shall be classified as high hazard if high hazard commodities are displayed or handled without protective wrappings or containers, in which case the following additional provisions shall apply:

- (1) Exits shall be located so that not more than 75 ft (23 m) of travel from any point is needed to reach the nearest exit.
- (2) From every point, there shall be not less than two exits accessible by travel in different directions (no common path of travel).
- (3) All vertical openings shall be enclosed.

37.1.6 Minimum Construction Requirements. (No special requirements.)

37.1.7 Occupant Load. The occupant load, in number of persons for whom means of egress and other provisions are required, shall be determined on the basis of the occupant load factors of Table 7.3.1.2 that are characteristic of the use of the space or shall be determined as the maximum probable population of the space under consideration, whichever is greater.

SECTION 37.2 MEANS OF EGRESS REQUIREMENTS

37.2.1 General.

37.2.1.1 All means of egress shall be in accordance with Chapter 7 and this chapter.

37.2.1.2 No inside open stairway, inside open escalator, or inside open ramp shall be permitted to serve as a component of the required means of egress system for more than one floor.

37.2.1.3 Where there are two or more floors below the street floor, the same stair or other exit shall be permitted to serve all floors, but all required exits from such areas shall be independent of any open stairways between the street floor and the floor below it.

37.2.1.4 Where a level, outside exit from upper floors is possible owing to hills, such outside exits shall be permitted to serve instead of horizontal exits. If, however, such outside exits from the upper floor also serve as an entrance from a principal street, the upper floor shall be classified as a street floor in accordance with the definition of *street floor* in 3.3.196 and shall be subject to the requirements of this chapter for street floors.

37.2.1.5 For special considerations for high hazard contents, see 37.1.5.2.

37.2.2 Means of Egress Components.

37.2.2.1 Components of means of egress shall be limited to the types described in 37.2.2.2 through 37.2.2.12.

37.2.2.2 Doors.

37.2.2.2.1 Doors complying with 7.2.1 shall be permitted.

37.2.2.2.2* Locks complying with Exception No. 2 to 7.2.1.5.1 shall be permitted only on principal entrance/exit doors.

37.2.2.2.3 The re-entry provisions of 7.2.1.5.2 shall not apply. (See 7.2.1.5.2, *Exception No. 1.*)

37.2.2.2.4 Delayed-egress locks complying with 7.2.1.6.1 shall be permitted.

37.2.2.2.5 Access-controlled egress doors complying with 7.2.1.6.2 shall be permitted in buildings protected throughout by an approved, supervised fire detection system in accordance with Section 9.6 or an approved automatic sprinkler system in accordance with Section 9.7.

37.2.2.2.6 Where horizontal or vertical security grilles or doors are used as a part of the required means of egress from a tenant space, such grilles or doors shall comply with Exception No. 2 to 7.2.1.4.1.

37.2.2.2.7 All doors at the foot of stairs from upper floors or at the head of stairs leading to floors below the street floor shall swing in the direction of egress travel.

37.2.2.2.8 Revolving doors complying with 7.2.1.10 shall be permitted.

37.2.2.2.9 In Class C mercantile occupancies, doors shall be permitted to swing inward against the direction of egress travel where such doors serve only the street floor area.

37.2.2.3 Stairs.

37.2.2.3.1 Stairs complying with 7.2.2 shall be permitted.

37.2.2.3.2 Spiral stairs complying with 7.2.2.2.3 shall be permitted.

37.2.2.3.3 Winders complying with 7.2.2.2.4 shall be permitted.

37.2.2.4 Smokeproof Enclosures. Smokeproof enclosures complying with 7.2.3 shall be permitted.

37.2.2.5 Horizontal Exits. Horizontal exits complying with 7.2.4 shall be permitted.

37.2.2.6 Ramps. Ramps complying with 7.2.5 shall be permitted.

37.2.2.7 Exit Passageways. Exit passageways complying with 7.2.6 shall be permitted.

*Exception:** In lieu of the provisions of 7.2.6.4, an exit passageway in a covered mall building shall be permitted to accommodate the following independently:

(a) The portion of the occupant load assigned to the exit passageway from only the covered mall/pedestrian way

(b) The largest occupant load assigned to the exit passageway from a single tenant space

37.2.2.8 Escalators and Moving Walks. Escalators and moving walks complying with 7.2.7 shall be permitted.

37.2.2.9 Fire Escape Stairs. Fire escape stairs complying with 7.2.8 shall be permitted.

37.2.2.10 Fire Escape Ladders. Fire escape ladders complying with 7.2.9 shall be permitted.

37.2.2.11 Alternating Tread Devices. Alternating tread devices complying with 7.2.11 shall be permitted.

37.2.2.12 Areas of Refuge. Areas of refuge complying with 7.2.12 shall be permitted.

Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, two rooms or spaces separated from each other by smoke-resistant partitions in accordance with the definition of area of refuge in 3.3.14 shall not be required.

37.2.3 Capacity of Means of Egress.

37.2.3.1 The capacity of means of egress shall be in accordance with Section 7.3.

37.2.3.2 In Class A and Class B mercantile occupancies, street floor exits shall be sufficient for the occupant load of the street floor plus the required capacity of stairs, ramps, escalators, and moving walks discharging through the street floor.

37.2.4 Number of Exits. Not less than two separate exits shall meet the following criteria:

- (1) They shall be provided on every story.
- (2) They shall be accessible from every part of every story or mezzanine.

Exception No. 1: Exit access travel shall be permitted to be common for the distances permitted as common paths of travel by 37.2.5.3.

Exception No. 2: A single means of egress shall be permitted in a Class C mercantile occupancy, provided that one of the following conditions is met:

(a) The travel distance to the exit or to a covered mall (if it is considered a pedestrian way) does not exceed 75 ft (23 m).

(b) The travel distance to the exit or to a covered mall (if it is considered a pedestrian way) does not exceed 100 ft (30 m), and the story on which the occupancy is located and all communicating levels that are traversed to reach the exit or covered mall are protected throughout by an approved automatic sprinkler system in accordance with Section 9.7.

Exception No. 3: A single means of egress to an exit or to a covered mall (if it is considered a pedestrian way) shall be permitted from a mezzanine within any Class A, Class B, or Class C mercantile occupancy, provided that the common path of travel does not exceed 75 ft (23 m), or does not exceed 100 ft (30 m) if protected throughout by an approved automatic sprinkler system in accordance with Section 9.7.

37.2.5 Arrangement of Means of Egress.

37.2.5.1 Means of egress shall be arranged in accordance with Section 7.5.

37.2.5.2* Dead-end corridors shall not exceed 50 ft (15 m).

37.2.5.3* Common paths of travel shall not exceed 75 ft (23 m).

Exception: A common path of travel shall be permitted for the first 100 ft (30 m) on a story protected throughout by an approved automatic sprinkler system in accordance with Section 9.7.

37.2.5.4 Aisles leading to each exit shall be required. The aggregate width of such aisles shall be not less than the required width of the exit.

37.2.5.5 Required aisles shall be not less than 28 in. (71 cm) in clear width.

37.2.5.6 In Class A mercantile occupancies, not less than one aisle of a 5-ft (1.5-m) minimum width shall lead directly to an exit.

37.2.5.7 If the only means of customer entrance is through one exterior wall of the building, two-thirds of the required egress width shall be located in such wall.

Exception: Bulk merchandising retail buildings. (See 37.4.5.2.)

37.2.5.8 Not less than one-half of the required exits shall be located so as to be reached without passing through checkout stands. In no case shall checkout stands or associated railings or barriers obstruct exits, required aisles, or approaches thereto.

37.2.5.9* Where wheeled carts or buggies are used by customers, adequate provision shall be made for the transit and parking of such carts to minimize the possibility that they might obstruct means of egress.

37.2.5.10 Exit access in Class A mercantile occupancies that are protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7 and exit access in all Class B and Class C mercantile occupancies shall be permitted to pass through storerooms, provided that the following conditions are met:

- (1) Not more than 50 percent of exit access shall be provided through the storeroom.
- (2) The storeroom shall not be subject to locking.
- (3) The main aisle through the storeroom shall be not less than 44 in. (112 cm) wide.
- (4) The path of travel through the storeroom, defined with fixed barriers, shall be direct and continuously maintained in an unobstructed condition.

37.2.6 Travel Distance to Exits. Travel distance to exits, measured in accordance with Section 7.6, shall not exceed 150 ft (45 m).

Exception: Travel distance shall not exceed 200 ft (60 m) in buildings protected throughout by an approved automatic sprinkler system in accordance with Section 9.7.

37.2.7 Discharge from Exits.

37.2.7.1 Exit discharge shall comply with Section 7.7 and 37.2.7.2.

37.2.7.2* Fifty percent of the exits shall be permitted to discharge through the level of exit discharge in accordance with 7.7.2 only where the building is protected throughout by an approved automatic sprinkler system in accordance with Section 9.7, and the distance of travel from the termination of the exit enclosure to an outside street door shall not exceed 50 ft (15 m).

37.2.8 Illumination of Means of Egress. Means of egress shall be illuminated in accordance with Section 7.8.

37.2.9 Emergency Lighting. Class A and Class B mercantile occupancies and covered mall buildings shall have emergency lighting facilities in accordance with Section 7.9.

37.2.10 Marking of Means of Egress. Means of egress shall have signs in accordance with Section 7.10.

Exception: Where an exit is immediately apparent from all portions of the sales area, the exit marking shall not be required.

37.2.11 Special Means of Egress Features. (Reserved.)

SECTION 37.3 PROTECTION

37.3.1 Protection of Vertical Openings. Any vertical opening shall be enclosed or protected in accordance with 8.2.5.

Exception No. 1: In Class A or Class B mercantile occupancies protected throughout by an approved automatic sprinkler system in accordance with Section 9.7, unprotected vertical openings shall be permitted at one of the following locations:

- (a) Among the street floor, the floor below, and the floor above
- (b) Among the street floor, the floor below, and the street floor mezzanines
- (c) Among the street floor, the street floor mezzanines, and the second floor, but not among more than three floor levels
- (d) Among all floors permitted in Class B mercantile occupancies
- (e) Among the floors permitted by (a), (b), (c), or (d) plus the floor immediately above if that floor is not used for sales purposes

Exception No. 2: In Class C mercantile occupancies, unenclosed vertical openings shall be permitted at one of the following locations:

- (a) Between the street floor and the mezzanine
- (b) Between the street floor and the floor below if the floor below is not used for sales purposes
- (c) Between the street floor and the second floor if the second floor is not used for sales purposes

Exception No. 3: In Class A or Class B mercantile occupancies protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, unenclosed openings in accordance with 8.2.5.5 shall be permitted.

Exception No. 4: In Class A or Class B mercantile occupancies, unenclosed openings shall be permitted between any two floors, such as between the street floor and the floor below, between the street floor and the mezzanine, or between the street floor and the second floor.

37.3.2 Protection from Hazards.

37.3.2.1* Hazardous areas including, but not limited to, areas used for general storage, boiler or furnace rooms, and maintenance shops that include woodworking and painting areas shall be protected in accordance with Section 8.4.

Exception: In general storage and stock areas protected by an automatic extinguishing system in accordance with Section 9.7, an enclosure, if provided, shall be exempt from the provisions of 8.4.1.2.

37.3.2.2* High hazard contents areas, as classified in Section 6.2, shall meet the following criteria:

- (1) The area shall be separated from other parts of the building by fire barriers having a fire resistance rating of not less than 1 hour, with all openings therein protected by ³/₄-hour fire protection-rated self-closing fire doors.
- (2) The area shall be protected by an automatic extinguishing system in accordance with Section 9.7.

37.3.3 Interior Finish.

37.3.3.1 Interior finish shall be in accordance with Section 10.2.

37.3.3.2 Interior Wall and Ceiling Finish. Interior wall and ceiling finish complying with 10.2.3 shall be Class A or Class B.

Exception: Existing Class C interior wall and ceiling finish complying with 10.2.3 shall be permitted as follows:

- (a) On walls
- (b) Throughout Class C stores

37.3.3.3 Interior Floor Finish. (No requirements.)

37.3.4 Detection, Alarm, and Communications Systems.

37.3.4.1 General. Class A mercantile occupancies shall be provided with a fire alarm system in accordance with Section 9.6.

37.3.4.2 Initiation. Initiation of the required fire alarm system shall be by manual means per 9.6.2.1(1).

Exception No. 1: Initiation shall be permitted to be by means of an approved automatic fire detection system in accordance with 9.6.2.1(2) that provides protection throughout the building.

Exception No. 2: Initiation shall be permitted to be by means of an approved automatic sprinkler system in accordance with 9.6.2.1(3) that provides protection throughout the building.

37.3.4.3 Notification.

37.3.4.3.1 Occupant Notification. During all times that the mercantile occupancy is occupied (*see 7.2.1.1.3*), the required fire alarm system, once initiated, shall perform one of the following functions.

- (a) It shall activate a general alarm in accordance with 9.6.3 throughout the mercantile occupancy.

Exception No. 1: Positive alarm sequence in accordance with 9.6.3.4 shall be permitted.

Exception No. 2: A presignal system in accordance with 9.6.3.3 shall be permitted.

- (b) It shall activate an alarm signal in a continuously attended location for the purpose of initiating emergency action by personnel trained to respond to emergencies. Emergency action shall be initiated by means of live voice public address system announcements originating from the attended location where the alarm signal is received. The system shall

be permitted to be used for other announcements, provided that the fire alarm use takes precedence over any other use.

Exception: Any other occupant notification means permitted by 9.6.3 shall be permitted in lieu of live voice public address system announcements.

37.3.4.3.2 Emergency Forces Notification. Emergency forces notification shall be provided and shall include notifying the following:

- (1) The fire department in accordance with 9.6.4
- (2) The local emergency organization, if provided

37.3.5 Extinguishment Requirements.

37.3.5.1 Mercantile occupancies shall be protected by an approved automatic sprinkler system in accordance with Section 9.7 as follows:

- (1) Throughout all mercantile occupancies with a story over 15,000 ft² (1400 m²) in area
- (2) Throughout all mercantile occupancies exceeding 30,000 ft² (2800 m²) in gross area
- (3) Throughout stories below the level of exit discharge where such stories have an area exceeding 2500 ft² (230 m²) used for the sale, storage, or handling of combustible goods and merchandise
- (4) Throughout mixed occupancies in accordance with 6.1.14 where the conditions of 37.3.5.1(1), (2), or (3) apply to the mercantile occupancy

Exception: Single-story buildings that meet the requirements of a street floor as defined in 3.3.196.

37.3.5.2 (Reserved.)

37.3.5.3 Portable fire extinguishers shall be provided in all mercantile occupancies in accordance with 9.7.4.1.

37.3.6 Corridors. (No requirements.)

37.3.7 Subdivision of Building Spaces. (No special requirements.)

37.3.8 Special Protection Features. Nonrated glazing and nonrated opening protectives per the exception to 37.1.2.2 shall be permitted between mercantile occupancies and parking structures.

SECTION 37.4 SPECIAL PROVISIONS

37.4.1 Windowless or Underground Buildings. (*See Section 11.7.*)

37.4.2 High-Rise Buildings. (No additional requirements.)

37.4.3 Open-Air Mercantile Operations.

37.4.3.1 Open-air mercantile operations, such as open-air markets, gasoline filling stations, roadside stands for the sale of farm produce, and other outdoor mercantile operations shall be arranged and conducted to maintain free and unobstructed ways of travel at all times. Such ways of travel shall allow prompt escape from any point of danger in case of fire or other emergency, with no dead ends in which persons might be trapped due to display stands, adjoining buildings, fences, vehicles, or other obstructions.

37.4.3.2 If mercantile operations are conducted in roofed-over areas, they shall be treated as mercantile buildings, provided that canopies over individual small stands to protect merchandise from the weather are not construed as constituting buildings for the purpose of this *Code*.

37.4.4 Covered Mall Buildings. The purpose of 37.4.4 is to establish minimum standards of life safety for covered mall buildings. (See 3.3.25.3.)

37.4.4.1 The covered mall building shall be treated as a single building for the purpose of calculation of means of egress and shall be subject to the requirements for appropriate occupancies, except as modified by the provisions of 37.4.4. The covered mall shall be of a clear width not less than that needed to accommodate egress requirements as set forth in other sections of this Code.

Exception: The covered mall shall be permitted to be considered a pedestrian way, in which case the travel distance within a tenant space to an exit or to the covered mall shall not exceed 200 ft (60 m) (see 37.2.6, exception) or shall not exceed the maximum for the appropriate occupancy. An additional 200 ft (60 m) shall be permitted for travel through the covered mall space if all the following requirements are met.

(a) The covered mall shall be of a clear width not less than that needed to accommodate egress requirements as set forth in other sections of this chapter but shall be not less than 20 ft (6.1 m) wide in its narrowest dimension.

(b)* On each side of the mall floor area, the covered mall shall be provided with an unobstructed exit access of not less than 10 ft (3 m) in clear width parallel to and adjacent to the mall tenant front. Such exit access shall lead to an exit having a width of not less than 66 in. (168 cm). (See 37.4.4.2.)

(c) The covered mall and all buildings connected thereto shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

(d) Walls dividing tenant spaces from each other shall extend from the floor to the underside of the roof deck, floor deck above, or ceiling where the ceiling is constructed to limit the transfer of smoke. Where the tenant areas are provided with an engineered smoke control system, walls shall not be required to divide tenant spaces from each other. No separation shall be required between a tenant space and the covered mall.

(e)* The covered mall shall be provided with a smoke control system.

37.4.4.2 Means of Egress Details.

37.4.4.2.1 Every floor of a covered mall shall be provided with the number of means of egress specified by Section 7.4, with not less than two means of egress remotely located from each other.

37.4.4.2.2 Class A and Class B mercantile occupancies connected to a covered mall shall be provided with the number of means of egress required by Section 7.4, with not less than two means of egress remotely located from one another.

37.4.4.2.3* Each individual anchor store shall have means of egress independent of the covered mall.

37.4.4.2.4 Every covered mall shall be provided with unobstructed exit access parallel to and adjacent to the mall tenant fronts. This exit access shall extend to each mall exit.

37.4.4.2.5* Rooms housing building service equipment, janitor closets, and service elevators shall be permitted to open directly onto exit passageways, provided that the following criteria are met:

(1) The required fire resistance rating between such rooms or areas and the exit passageway is maintained in accordance with 7.1.3.2.

- (2) Such rooms or areas are protected by an approved automatic sprinkler system in accordance with Section 9.7; however, the exceptions in NFPA 13, *Standard for the Installation of Sprinkler Systems*, that permit the omission of sprinklers from such rooms are not permitted.
- (3) Service elevators opening into the exit passageway shall not open into areas other than exit passageways.
- (4) Where exit stair enclosures discharge into the exit passageway, the provisions of 7.2.1.5.2 shall apply regardless of the number of stories served.

37.4.4.2.6 Emergency Lighting. (See 37.2.9.)

37.4.4.3 Detection, Alarm, and Communications Systems.

37.4.4.3.1 General. Covered malls shall be provided with a fire alarm system in accordance with Section 9.6.

37.4.4.3.2 Initiation. Initiation of the required fire alarm system shall be by means of the required automatic sprinkler system in accordance with 9.6.2.1(3).

37.4.4.3.3 Notification.

37.4.4.3.3.1 Occupant Notification. During all times that the covered mall is occupied (see 7.2.1.1.3), the required fire alarm system, once initiated, shall perform one of the following functions:

(a) It shall activate a general alarm in accordance with 9.6.3 throughout the covered mall.

Exception No. 1: Positive alarm sequence in accordance with 9.6.3.4 shall be permitted.

Exception No. 2: A presignal system in accordance with 9.6.3.3 shall be permitted.

(b) It shall activate an alarm signal in a continuously attended location for the purpose of initiating emergency action by personnel trained to respond to emergencies. Emergency action shall be initiated by means of live voice public address system announcements originating from the attended location where the alarm signal is received. The system shall be permitted to be used for other announcements, provided that the fire alarm use takes precedence over any other use.

Exception: Any other occupant notification means permitted by 9.6.3 shall be permitted in lieu of live voice public address system announcements.

37.4.4.3.3.2 Emergency Forces Notification. Emergency forces notification shall be provided and shall include notifying the following:

- (1) The fire department in accordance with 9.6.4
 (2) The local emergency organization, if provided

37.4.4.3.4 Emergency Control. The fire alarm system shall be arranged to automatically actuate smoke management or smoke control systems in accordance with 9.6.5.2(3).

37.4.5 Bulk Merchandising Retail Buildings. Existing bulk merchandising retail buildings exceeding 15,000 ft² (1400 m²) in area shall comply with the requirements of this chapter as modified by 37.4.5.1 through 37.4.5.6.

37.4.5.1 Minimum Construction Requirements. (No requirement.)

37.4.5.2 Means of Egress Requirements. All means of egress shall be in accordance with Chapter 7 and this chapter. Not less than 50 percent of the required egress capacity shall be located independent of the main entrance/exit doors.

37.4.5.3 Storage, Arrangement, Protection, and Quantities of Hazardous Commodities.

37.4.5.3.1 The storage, arrangement, protection, and quantities of hazardous commodities shall be in accordance with the applicable portions of the following:

- (1) NFPA 13, *Standard for the Installation of Sprinkler Systems*
- (2) NFPA 30, *Flammable and Combustible Liquids Code*
- (3) NFPA 30B, *Code for the Manufacture and Storage of Aerosol Products*
- (4) NFPA 230, *Standard for the Fire Protection of Storage*
- (5) NFPA 231D, *Standard for Storage of Rubber Tires*
- (6) NFPA 430, *Code for the Storage of Liquid and Solid Oxidizers*
- (7) NFPA 432, *Code for the Storage of Organic Peroxide Formulations*
- (8) NFPA 434, *Code for the Storage of Pesticides*

37.4.5.3.2* High hazard commodities without protective containers shall not be stored or displayed within 100 ft (30 m) of the main entrance/exit doors.

37.4.5.4 Detection, Alarm, and Communications Systems.

37.4.5.4.1 **General.** Bulk merchandising retail buildings shall be provided with a fire alarm system in accordance with Section 9.6.

37.4.5.4.2 **Initiation.** Initiation of the required fire alarm system shall be by means of the required approved automatic sprinkler system (*see 37.4.5.5*) in accordance with 9.6.2.1(3).

37.4.5.4.3 **Occupant Notification.** During all times that the building is occupied (*see 7.2.1.1.3*), the required fire alarm system, once initiated, shall perform one of the following functions.

(a) It shall activate a general alarm in accordance with 9.6.3 throughout the building.

Exception No. 1: Positive alarm sequence in accordance with 9.6.3.4 shall be permitted.

Exception No. 2: A presignal system in accordance with 9.6.3.3 shall be permitted.

(b) It shall activate an alarm signal in a continuously attended location for the purpose of initiating emergency action by personnel trained to respond to emergencies. Emergency action shall be initiated by means of live voice public address system announcements originating from the attended location where the alarm signal is received. The system shall be permitted to be used for other announcements, provided that the fire alarm use takes precedence over any other use.

Exception: Any other occupant notification means permitted by 9.6.3 shall be permitted in lieu of live voice public address system announcements.

37.4.5.4.4 **Emergency Forces Notification.** Emergency forces notification shall be provided and shall include notifying the following:

- (1) The fire department in accordance with 9.6.4
- (2) The local emergency organization, if provided

37.4.5.5 **Extinguishing Requirements.** Bulk merchandising retail buildings shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7 and the applicable provisions of the following:

- (1) NFPA 13, *Standard for the Installation of Sprinkler Systems*
- (2) NFPA 30, *Flammable and Combustible Liquids Code*
- (3) NFPA 30B, *Code for the Manufacture and Storage of Aerosol Products*
- (4) NFPA 230, *Standard for the Fire Protection of Storage*
- (5) NFPA 231D, *Standard for Storage of Rubber Tires*

37.4.5.6 **Emergency Plan and Employee Training.** There shall be in effect an approved written plan for the emergency egress and relocation of occupants. All employees shall be instructed and periodically drilled with respect to their duties under the plan.

SECTION 37.5 BUILDING SERVICES

37.5.1 **Utilities.** Utilities shall comply with the provisions of Section 9.1.

37.5.2 **Heating, Ventilating, and Air Conditioning.** Heating, ventilating, and air conditioning equipment shall comply with the provisions of Section 9.2.

37.5.3 **Elevators, Escalators, and Conveyors.** Elevators, escalators, and conveyors shall comply with the provisions of Section 9.4.

37.5.4 **Rubbish Chutes, Incinerators, and Laundry Chutes.** Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 9.5.

SECTION 37.6 RESERVED

SECTION 37.7 OPERATING FEATURES

37.7.1 **Drills.** In every Class A or Class B mercantile occupancy, employees shall be periodically trained in accordance with Section 4.7.

37.7.2 **Extinguisher Training.** Employees of mercantile occupancies shall be periodically instructed in the use of portable fire extinguishers.

Chapter 38 NEW BUSINESS OCCUPANCIES

SECTION 38.1 GENERAL REQUIREMENTS

38.1.1 Application.

38.1.1.1 The requirements of this chapter apply to the following:

- (1) New buildings or portions thereof used as business occupancies (*see 1.4.1*)
- (2) Additions made to, or used as, a business occupancy (*see 4.6.6 and 38.1.1.3*)
- (3) Alterations, modernizations, or renovations of existing business occupancies (*see 1.11.7*)
- (4) Existing buildings or portions thereof upon change of occupancy to a business occupancy (*see 4.6.11*)

*Exception:** Facilities where the authority having jurisdiction has determined equivalent safety is provided in accordance with Section 1.5.

38.1.1.2 This chapter establishes life safety requirements for all new business buildings. Specific requirements for high-rise buildings (*see definition in 3.3.101*) are contained in paragraphs pertaining thereto.

38.1.1.3 Additions to existing buildings shall conform to the requirements for new construction. Existing portions of the structure shall not be required to be modified, provided that the new construction has not diminished the fire safety features of the facility.

38.1.2 Mixed Occupancies.

38.1.2.1 Mixed occupancies shall comply with 6.1.14.

38.1.2.2 Combined Business Occupancies and Parking Structures. Walls separating parking structures from business occupancies shall have a fire resistance rating of not less than 2 hours.

Exception: In enclosed parking structures that are protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, or in open-air parking structures, nonrated glazing and nonrated opening protectives shall be permitted if all of the following conditions are met:

- (a) The openings do not exceed 25 percent of the area of the wall in which they are located.
- (b) The openings are used as the main entrance and for associated sidelight functions.
- (c) The enclosed connecting business building is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.
- (d) The floor elevation of the business occupancy is not less than 4 in. (10.2 cm) above the floor level of the parking structure.
- (e) No vehicle is able to park or drive within 10 ft (3 m) of the openings.
- (f) The openings are protected by not less than a glass membrane.
- (g) Any doors in the glass membrane are self-closing.

38.1.3 Special Definitions. (None.)

38.1.4 Classification of Occupancy. Business occupancies shall include all buildings and structures or parts thereof with occupancy as defined in 6.1.11.

38.1.5 Classification of Hazard of Contents.

38.1.5.1 The contents of business occupancies shall be classified as ordinary hazard in accordance with Section 6.2.

38.1.5.2 For purposes of the design of an automatic sprinkler system, a business occupancy shall be classified as a light hazard occupancy in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*.

38.1.6 Minimum Construction Requirements. (No requirements.)

38.1.7 Occupant Load. The occupant load, in number of persons for whom means of egress and other provisions are required, shall be determined on the basis of the occupant load factors of Table 7.3.1.2 that are characteristic of the use of the space or shall be determined as the maximum probable population of the space under consideration, whichever is greater.

SECTION 38.2 MEANS OF EGRESS REQUIREMENTS

38.2.1 General.

38.2.1.1 All means of egress shall be in accordance with Chapter 7 and this chapter.

38.2.1.2 If, owing to differences in grade, any street floor exits are at points above or below the street or ground level, such exits shall comply with the provisions for exits from upper floors or floors below the street floor.

38.2.1.3 Where two or more floors below the street floor are occupied for business use, the same stairs or ramps shall be permitted to serve each.

Exception: No inside open stairway or inside open ramp shall be permitted to serve as a required egress facility from more than one floor level.

38.2.1.4 Floor levels below the street floor used only for storage, heating, and other service equipment and not subject to business occupancy shall have means of egress in accordance with Chapter 42.

38.2.2 Means of Egress Components.

38.2.2.1 Means of egress components shall be limited to the types described in 38.2.2.2 through 38.2.2.12.

38.2.2.2 Doors.

38.2.2.2.1 Doors complying with 7.2.1 shall be permitted.

38.2.2.2.2* Locks complying with Exception No. 2 to 7.2.1.5.1 shall be permitted only on principal entrance/exit doors.

38.2.2.2.3 (Reserved.)

38.2.2.2.4 Delayed-egress locks complying with 7.2.1.6.1 shall be permitted.

38.2.2.2.5 Access-controlled egress doors complying with 7.2.1.6.2 shall be permitted.

38.2.2.2.6 Where horizontal or vertical security grilles or doors are used as part of the required means of egress from a tenant space, such grilles or doors shall comply with Exception No. 2 to 7.2.1.4.1.

38.2.2.2.7 (Reserved.)

38.2.2.2.8 Revolving doors complying with 7.2.1.10 shall be permitted.

38.2.2.3 Stairs.

38.2.2.3.1 Stairs complying with 7.2.2 shall be permitted.

38.2.2.3.2 Spiral stairs complying with 7.2.2.3 shall be permitted.

38.2.2.4 Smokeproof Enclosures. Smokeproof enclosures complying with 7.2.3 shall be permitted.

38.2.2.5 Horizontal Exits. Horizontal exits complying with 7.2.4 shall be permitted.

38.2.2.6 Ramps. Ramps complying with 7.2.5 shall be permitted.

38.2.2.7 Exit Passageways. Exit passageways complying with 7.2.6 shall be permitted.

38.2.2.8 (Reserved.)

38.2.2.9 (Reserved.)

38.2.2.10 Fire Escape Ladders. Fire escape ladders complying with 7.2.9 shall be permitted.

38.2.2.11 Alternating Tread Devices. Alternating tread devices complying with 7.2.11 shall be permitted.

38.2.2.12 Areas of Refuge. Areas of refuge complying with 7.2.12 shall be permitted.

Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, two rooms or spaces separated from each other by smoke-resistant partitions in accordance with the definition of area of refuge in 3.3.14 shall not be required.

38.2.3 Capacity of Means of Egress.

38.2.3.1 The capacity of means of egress shall be in accordance with Section 7.3.

38.2.3.2* The clear width of any corridor or passageway serving an occupant load of 50 or more shall be not less than 44 in. (112 cm).

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

38.2.4 Number of Exits.

38.2.4.1 (Reserved.)

38.2.4.2 Not less than two separate exits shall meet the following criteria:

- (1) They shall be provided on every story.
- (2) They shall be accessible from every part of every story and mezzanine.

Exception No. 1: Exit access travel shall be permitted to be common for the distances permitted as common paths of travel by 38.2.5.3.

Exception No. 2: A single exit shall be permitted for a room or area with a total occupant load of fewer than 100 persons, provided that the following criteria are met:

(a) The exit shall discharge directly to the outside at the level of exit discharge for the building.

(b) The total distance of travel from any point, including travel within the exit, shall not exceed 100 ft (30 m).

(c) Such travel shall be on the same floor level or, if traversing of stairs is necessary, such stairs shall not exceed 15 ft (4.5 m) in height, and the stairs shall be provided with complete enclosures to separate them from any other part of the building, with no door openings therein.

(d) A single outside stair in accordance with 7.2.2 shall be permitted to serve all floors permitted within the 15-ft (4.5-m) vertical travel limitation.

Exception No. 3: Any business occupancy not exceeding three stories, and not exceeding an occupant load of 30 people per floor, shall be permitted a single separate exit to each floor. This exception shall be permitted only where the total travel distance to the outside of the building does not exceed 100 ft (30 m) and where the exit is enclosed in accordance with 7.1.3.2, serves no other levels, and discharges directly to the outside. A single outside stair in accordance with 7.2.2 shall be permitted to serve all floors.

Exception No. 4: A single means of egress shall be permitted from a mezzanine within a business occupancy, provided that the common path of travel does not exceed 75 ft (23 m), or 100 ft (30 m) if protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

Exception No. 5: A single exit shall be permitted for a maximum two-story, single-tenant space/building protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7 where the total travel to the outside does not exceed 100 ft (30 m).

38.2.5 Arrangement of Means of Egress.

38.2.5.1 Means of egress shall be arranged in accordance with Section 7.5.

38.2.5.2 Dead-end corridors shall not exceed 20 ft (6.1 m).

Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, dead-end corridors shall not exceed 50 ft (15 m).

38.2.5.3 Common paths of travel shall not exceed 75 ft (23 m).

Exception No. 1: A common path of travel shall be permitted for the first 100 ft (30 m) in a building protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

Exception No. 2: A common path of travel shall be permitted for the first 100 ft (30 m) within a single tenant space having an occupant load not exceeding 30 persons.

38.2.6 Travel Distance to Exits. Travel distance to exits, measured in accordance with Section 7.6, shall not exceed 200 ft (60 m).

Exception: Travel distance shall not exceed 300 ft (91 m) in buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

38.2.7 Discharge from Exits. Exit discharge shall comply with Section 7.7.

38.2.8 Illumination of Means of Egress. Means of egress shall be illuminated in accordance with Section 7.8.

38.2.9 Emergency Lighting.

38.2.9.1 Emergency lighting shall be provided in accordance with Section 7.9 in any building where any one of the following conditions exists:

- (1) The building is two or more stories in height above the level of exit discharge.
- (2) The occupancy is subject to 50 or more occupants above or below the level of exit discharge.
- (3) The occupancy is subject to 300 or more total occupants.

38.2.9.2 Emergency lighting in accordance with Section 7.9 shall be provided for all underground and windowless structures as defined in 3.3.205 and 3.3.212.

38.2.10 Marking of Means of Egress. Means of egress shall have signs in accordance with Section 7.10.

38.2.11 Special Means of Egress Features. (Reserved.)

SECTION 38.3 PROTECTION

38.3.1 Protection of Vertical Openings.

38.3.1.1 Any vertical opening shall be enclosed or protected in accordance with 8.2.5.

Exception No. 1: Unenclosed vertical openings in accordance with 8.2.5.8 shall be permitted.

Exception No. 2: Exit access stairs shall be permitted to be unenclosed in two-story single-tenant spaces that are provided with a single exit in accordance with Exception No. 4 to 38.2.4.2.

38.3.1.2 Floors below the street floor used for storage or other than business occupancy shall have no unprotected openings to business occupancy floors.

38.3.2 Protection from Hazards.

38.3.2.1* Hazardous areas including, but not limited to, areas used for general storage, boiler or furnace rooms, and maintenance shops that include woodworking and painting areas shall be protected in accordance with Section 8.4.

38.3.2.2* High hazard contents areas, as classified in Section 6.2, shall meet the following criteria:

- (1) The area shall be separated from other parts of the building by fire barriers having a fire resistance rating of not less than 1 hour, with all openings therein protected by $\frac{3}{4}$ -hour fire protection-rated self-closing fire doors.
- (2) The area shall be protected by an automatic extinguishing system in accordance with Section 9.7.

38.3.3 Interior Finish.

38.3.3.1 Interior finish shall be in accordance with Section 10.2.

38.3.3.2 Interior Wall and Ceiling Finish. Interior wall and ceiling finish complying with 10.2.3 shall be Class A or Class B in exits and in enclosed corridors furnishing access to exits; and Class A, Class B, or Class C in office areas.

38.3.3.3 Interior Floor Finish. Interior floor finish complying with 10.2.7 shall be Class I or Class II in corridors and exits.

38.3.4 Detection, Alarm, and Communications Systems.

38.3.4.1 General. A fire alarm system in accordance with Section 9.6 shall be provided in any business occupancy where any one of the following conditions exists:

- (1) The building is two or more stories in height above the level of exit discharge.
- (2) The occupancy is subject to 50 or more occupants above or below the level of exit discharge.
- (3) The occupancy is subject to 300 or more total occupants.

38.3.4.2 Initiation. Initiation of the required fire alarm system shall be by manual means in accordance with 9.6.2.1(1).

Exception No. 1: Initiation shall be permitted by means of an approved automatic fire detection system in accordance with 9.6.2.1(2) that provides protection throughout the building.

Exception No. 2: Initiation shall be permitted by means of an approved automatic sprinkler system in accordance with 9.6.2.1(3) that provides protection throughout the building.

38.3.4.3 Occupant Notification. During all times that the building is occupied (*see* 7.2.1.1.3), the required fire alarm

system, once initiated, shall perform one of the following functions.

(a) It shall activate a general alarm in accordance with 9.6.3 throughout the building.

Exception: Positive alarm sequence in accordance with 9.6.3.4 shall be permitted.

(b) It shall activate an alarm signal in a continuously attended location for the purpose of initiating emergency action by personnel trained to respond to emergencies. Emergency action shall be initiated by means of live voice public address system announcements originating from the attended location where the alarm signal is received. The system shall be permitted to be used for other announcements, provided that the fire alarm use takes precedence over any other use.

Exception: Any other occupant notification means permitted by 9.6.3 shall be permitted in lieu of live voice public address system announcements.

38.3.5 Extinguishment Requirements. Portable fire extinguishers shall be provided in every business occupancy in accordance with 9.7.4.1. (*See also Section 38.4.*)

38.3.6 Corridors.

38.3.6.1* Where access to exits is provided by corridors, such corridors shall be separated from use areas by walls having a fire resistance rating of not less than 1 hour in accordance with 8.2.3.

Exception No. 1: Where exits are available from an open floor area.*

Exception No. 2: Within a space occupied by a single tenant.*

Exception No. 3: Within buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

38.3.6.2 Openings in corridor walls required by 38.3.6.1 to have a fire resistance rating shall be protected in accordance with 8.2.3.

38.3.7 Subdivision of Building Spaces. (No special requirements.)

38.3.8 Special Protection Features. Nonrated glazing and nonrated opening protectives per the exception to 38.1.2.2 shall be permitted between business occupancies and parking structures.

SECTION 38.4 SPECIAL PROVISIONS

38.4.1 Windowless or Underground Buildings. (*See Section 11.7.*)

38.4.2* High-Rise Buildings. High-rise buildings shall comply with Section 11.8.

SECTION 38.5 BUILDING SERVICES

38.5.1 Utilities. Utilities shall comply with the provisions of Section 9.1.

38.5.2 Heating, Ventilating, and Air Conditioning. Heating, ventilating, and air conditioning equipment shall comply with the provisions of Section 9.2.

38.5.3 Elevators, Escalators, and Conveyors. Elevators, escalators, and conveyors shall comply with the provisions of Section 9.4.

38.5.4 Rubbish Chutes, Incinerators, and Laundry Chutes. Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 9.5.

SECTION 38.6 RESERVED

SECTION 38.7 OPERATING FEATURES

38.7.1 Drills. In any business occupancy building occupied by more than 500 persons or more than 100 persons above or

below the street level, employees and supervisory personnel shall be periodically instructed in accordance with Section 4.7 and shall hold drills periodically where practicable.

38.7.2 Extinguisher Training. Designated employees of business occupancies shall be periodically instructed in the use of portable fire extinguishers.

Chapter 39 EXISTING BUSINESS OCCUPANCIES

SECTION 39.1 GENERAL REQUIREMENTS

39.1.1 Application.

39.1.1.1 The requirements of this chapter apply to existing buildings or portions thereof currently occupied as business occupancies. (See also 38.1.1.1.)

*Exception:** Facilities where the authority having jurisdiction has determined equivalent safety is provided in accordance with Section 1.5.

39.1.1.2 This chapter establishes life safety requirements for existing business buildings. Specific requirements for high-rise buildings (see definition in 3.3.101) are contained in paragraphs pertaining thereto.

39.1.2 Mixed Occupancies.

39.1.2.1 Mixed occupancies shall comply with 6.1.14.

39.1.2.2 Combined Business Occupancies and Parking Structures. Walls separating parking structures from business occupancies shall have a fire resistance rating of not less than 2 hours.

Exception: In enclosed parking structures that are protected throughout by an approved automatic sprinkler system in accordance with Section 9.7, or in open-air parking structures, nonrated glazing and nonrated opening protectives shall be permitted if all of the following conditions are met:

(a) The openings do not exceed 25 percent of the area of the wall in which they are located.

(b) The openings are used as the main entrance and for associated sidelight functions.

(c) The enclosed connecting business building is protected throughout by an approved automatic sprinkler system in accordance with Section 9.7.

(d) The floor elevation of the business occupancy is not less than 4 in. (10.2 cm) above the floor level of the parking structure.

(e) No vehicle is able to park or drive within 10 ft (3 m) of the openings.

(f) The openings are protected by not less than a glass membrane.

(g) Any doors in the glass membrane are self-closing.

39.1.3 Special Definitions. (None.)

39.1.4 Classification of Occupancy. Business occupancies shall include all buildings and structures or parts thereof with occupancy as defined in 6.1.11.

39.1.5 Classification of Hazard of Contents.

39.1.5.1 The contents of business occupancies shall be classified as ordinary hazard in accordance with Section 6.2.

39.1.5.2 For purposes of the design of an automatic sprinkler system, a business occupancy shall be classified as a light hazard occupancy in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*.

39.1.6 Minimum Construction Requirements. (No requirements.)

39.1.7 Occupant Load. The occupant load, in number of persons for whom means of egress and other provisions are required, shall be determined on the basis of the occupant load factors of Table 7.3.1.2 that are characteristic of the use of the space or shall be determined as the maximum probable population of the space under consideration, whichever is greater.

SECTION 39.2 MEANS OF EGRESS REQUIREMENTS

39.2.1 General.

39.2.1.1 All means of egress shall be in accordance with Chapter 7 and this chapter.

39.2.1.2 If, owing to differences in grade, any street floor exits are at points above or below the street or ground level, such exits shall comply with the provisions for exits from upper floors or floors below the street floor.

39.2.1.3 Where two or more floors below the street floor are occupied for business use, the same stairs, escalators, or ramps shall be permitted to serve each.

Exception: No inside open stairway, inside open escalator, or inside open ramp shall be permitted to serve as a required egress facility from more than one floor level.

39.2.1.4 Floor levels below the street floor used only for storage, heating, and other service equipment and not subject to business occupancy shall have means of egress in accordance with Chapter 42.

39.2.2 Means of Egress Components.

39.2.2.1 Means of egress components shall be limited to the types described in 39.2.2.2 through 39.2.2.12.

39.2.2.2 Doors.

39.2.2.2.1 Doors complying with 7.2.1 shall be permitted.

39.2.2.2.2* Locks complying with Exception No. 2 to 7.2.1.5.1 shall be permitted only on principal entrance/exit doors.

39.2.2.2.3 The re-entry provisions of 7.2.1.5.2 shall not apply. (See 7.2.1.5.2, *Exception No. 2(a)*.)

39.2.2.2.4 Delayed-egress locks complying with 7.2.1.6.1 shall be permitted.

39.2.2.2.5 Access-controlled egress doors complying with 7.2.1.6.2 shall be permitted.

39.2.2.2.6 Where horizontal or vertical security grilles or doors are used as part of the required means of egress from a tenant space, such grilles or doors shall comply with Exception No. 2 to 7.2.1.4.1.

39.2.2.2.7 Existing horizontal-sliding or vertical-rolling fire doors shall be permitted in existing means of egress under the following conditions:

- (1) They are held open by fusible links.
- (2) The links are rated at not less than 165°F (74°C).
- (3) The fusible links are located not more than 10 ft (3 m) above the floor.
- (4) The fusible link is in immediate proximity to the door opening.
- (5) The fusible link is not located above a ceiling.
- (6) The door is not credited with providing any protection under this Code.

39.2.2.2.8 Revolving doors complying with 7.2.1.10 shall be permitted.

39.2.2.3 Stairs.

39.2.2.3.1 Stairs complying with 7.2.2 shall be permitted.

39.2.2.3.2 Spiral stairs complying with 7.2.2.2.3 shall be permitted.

39.2.2.3.3 Winders complying with 7.2.2.2.4 shall be permitted.

39.2.2.4 Smokeproof Enclosures. Smokeproof enclosures complying with 7.2.3 shall be permitted.

39.2.2.5 Horizontal Exits. Horizontal exits complying with 7.2.4 shall be permitted.

39.2.2.6 Ramps. Ramps complying with 7.2.5 shall be permitted.

39.2.2.7 Exit Passageways. Exit passageways complying with 7.2.6 shall be permitted.

39.2.2.8 Escalators and Moving Walks. Escalators and moving walks complying with 7.2.7 shall be permitted.

39.2.2.9 Fire Escape Stairs. Fire escape stairs complying with 7.2.8 shall be permitted.

39.2.2.10 Fire Escape Ladders. Fire escape ladders complying with 7.2.9 shall be permitted.

39.2.2.11 Alternating Tread Devices. Alternating tread devices complying with 7.2.11 shall be permitted.

39.2.2.12 Areas of Refuge. Areas of refuge complying with 7.2.12 shall be permitted.

Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, two rooms or spaces separated from each other by smoke-resistant partitions in accordance with the definition of area of refuge in 3.3.14 shall not be required.

39.2.3 Capacity of Means of Egress.

39.2.3.1 The capacity of means of egress shall be in accordance with Section 7.3.

39.2.3.2 The clear width of any corridor or passageway serving an occupant load of 50 or more shall be not less than 44 in. (112 cm).

39.2.3.3 Street floor exits shall be sufficient for the occupant load of the street floor plus the required capacity of stairs, ramps, escalators, and moving walks discharging through the street floor.

39.2.4 Number of Exits.

39.2.4.1 The number of exits shall be in accordance with 39.2.4.2. The requirements of 7.4.1.2 shall not apply.

39.2.4.2 Not less than two separate exits shall meet the following criteria:

- (1) They shall be provided on every story.
- (2) They shall be accessible from every part of every story and mezzanine.

Exception No. 1: Exit access travel shall be permitted to be common for the distances permitted as common paths of travel by 39.2.5.3.

Exception No. 2: A single exit shall be permitted for a room or area with a total occupant load of fewer than 100 persons, provided that the following criteria are met:

- (a) The exit shall discharge directly to the outside at the level of exit discharge for the building.
- (b) The total distance of travel from any point, including travel within the exit, shall not exceed 100 ft (30 m).

(c) Such travel shall be on the same floor level or, if traversing of stairs is necessary, such stairs shall not exceed 15 ft (4.5 m) in height, and the stairs shall be provided with complete enclosures to separate them from any other part of the building, with no door openings therein.

(d) A single outside stair in accordance with 7.2.2 shall be permitted to serve all floors permitted within the 15-ft (4.5-m) vertical travel limitation.

Exception No. 3: Any business occupancy not exceeding three stories, and not exceeding an occupant load of 30 people per floor, shall be permitted a single separate exit to each floor. This exception is permitted only where the total travel distance to the outside of the building does not exceed 100 ft (30 m) and where the exit is enclosed in accordance with 5.1.3.2, serves no other levels, and discharges directly to the outside. A single outside stair in accordance with 7.2.2 shall be permitted to serve all floors.

Exception No. 4: A single means of egress shall be permitted from a mezzanine within a business occupancy, provided that the common path of travel does not exceed 75 ft (23 m), or 100 ft (30 m) if protected throughout by an approved automatic sprinkler system in accordance with Section 9.7.

Exception No. 5: A single exit shall be permitted for a maximum two-story, single-tenant space/building protected throughout by an approved automatic sprinkler system in accordance with Section 9.7 where the total travel to the outside does not exceed 100 ft (30 m).

39.2.5 Arrangement of Means of Egress.

39.2.5.1 Means of egress shall be arranged in accordance with Section 7.5.

39.2.5.2* Dead-end corridors shall not exceed 50 ft (15 m).

39.2.5.3* Common paths of travel shall not exceed 75 ft (23 m).

Exception No. 1: A common path of travel shall be permitted for the first 100 ft (30 m) on a story protected throughout by an approved automatic sprinkler system in accordance with Section 9.7.

Exception No. 2: A single tenant space with an occupant load not exceeding 30 people shall be permitted to have a single exit access, provided that the corridor to which that exit access leads does not have a dead end exceeding 50 ft (15 m).

39.2.6 Travel Distance to Exits. Travel distance to exits, measured in accordance with Section 7.6, shall not exceed 200 ft (60 m).

Exception: Travel distance shall not exceed 300 ft (91 m) in buildings protected throughout by an approved automatic sprinkler system in accordance with Section 9.7.

39.2.7 Discharge from Exits. Exit discharge shall comply with Section 7.7.

39.2.8 Illumination of Means of Egress. Means of egress shall be illuminated in accordance with Section 7.8.

39.2.9 Emergency Lighting.

39.2.9.1 Emergency lighting shall be provided in accordance with Section 7.9 in any building where any one of the following conditions exists:

- (1) The building is two or more stories in height above the level of exit discharge.
- (2) The occupancy is subject to 100 or more occupants above or below the level of exit discharge.
- (3) The occupancy is subject to 1000 or more total occupants.

39.2.9.2 Emergency lighting in accordance with Section 7.9 shall be provided for all underground and windowless structures as defined in 3.3.205 and 3.3.212.

39.2.10 Marking of Means of Egress. Means of egress shall have signs in accordance with Section 7.10.

39.2.11 Special Means of Egress Features. (Reserved.)**SECTION 39.3 PROTECTION****39.3.1 Protection of Vertical Openings.**

39.3.1.1 Any vertical opening shall be enclosed or protected in accordance with 8.2.5.

Exception No. 1: Unenclosed vertical openings in accordance with 8.2.5.8 shall be permitted.

Exception No. 2: Exit access stairs shall be permitted to be unenclosed in two-story single-tenant spaces that are provided with a single exit in accordance with Exception No. 4 to 39.2.4.2.

Exception No. 3: In buildings protected throughout by an approved automatic sprinkler system in accordance with Section 9.7, unprotected vertical openings shall be permitted. This exception shall be permitted only where no unprotected vertical opening serves as any part of any required means of egress and all required exits consist of outside stairs in accordance with 7.2.2, smokeproof enclosures in accordance with 7.2.3, or horizontal exits in accordance with 7.2.4.

39.3.1.2 Floors below the street floor used for storage or other than business occupancy shall have no unprotected openings to business occupancy floors.

39.3.2 Protection from Hazards.

39.3.2.1* Hazardous areas including, but not limited to, areas used for general storage, boiler or furnace rooms, and maintenance shops that include woodworking and painting areas shall be protected in accordance with Section 8.4.

39.3.2.2* High hazard contents areas, as classified in Section 6.2, shall meet the following criteria:

- (1) The area shall be separated from other parts of the building by fire barriers having a fire resistance rating of not less than 1 hour, with all openings therein protected by $3/4$ -hour fire protection-rated self-closing fire doors.
- (2) The area shall be protected by an automatic extinguishing system in accordance with Section 9.7.

39.3.3 Interior Finish.

39.3.3.1 Interior finish shall be in accordance with Section 10.2.

39.3.3.2 Interior Wall and Ceiling Finish. Interior wall and ceiling finish complying with 10.2.3 shall be Class A or Class B in exits and in enclosed corridors furnishing access to exits; and Class A, Class B, or Class C in office areas.

39.3.3.3 Interior Floor Finish. (No requirements.)

39.3.4 Detection, Alarm, and Communications Systems.

39.3.4.1 General. A fire alarm system in accordance with Section 9.6 shall be provided in any business occupancy where any one of the following conditions exists:

- (1) The building is two or more stories in height above the level of exit discharge.
- (2) The occupancy is subject to 100 or more occupants above or below the level of exit discharge.
- (3) The occupancy is subject to 1000 or more total occupants.

39.3.4.2 Initiation. Initiation of the required fire alarm system shall be by manual means in accordance with 9.6.2.1(1).

Exception No. 1: Initiation shall be permitted by means of an approved automatic fire detection system in accordance with 9.6.2.1(2) that provides protection throughout the building.

Exception No. 2: Initiation shall be permitted by means of an approved automatic sprinkler system in accordance with 9.6.2.1(3) that provides protection throughout the building.

39.3.4.3 Occupant Notification. During all times that the building is occupied (see 7.2.1.1.3), the required fire alarm system, once initiated, shall perform one of the following functions.

(a) It shall activate a general alarm in accordance with 9.6.3 throughout the building.

Exception No. 1: Positive alarm sequence in accordance with 9.6.3.4 shall be permitted.

Exception No. 2: A presignal system in accordance with 9.6.3.3 shall be permitted.

(b) It shall activate an alarm signal in a continuously attended location for the purpose of initiating emergency action by personnel trained to respond to emergencies. Emergency action shall be initiated by means of live voice public address system announcements originating from the attended location where the alarm signal is received. The system shall be permitted to be used for other announcements, provided that the fire alarm use takes precedence over any other use.

Exception: Any other occupant notification means permitted by 9.6.3 shall be permitted in lieu of live voice public address system announcements.

39.3.5 Extinguishment Requirements. Portable fire extinguishers shall be provided in every business occupancy in accordance with 9.7.4.1. (See also Section 39.4.)

39.3.6 Corridors. (No requirements.)

39.3.7 Subdivision of Building Spaces. (No special requirements.)

39.3.8 Special Protection Features. Nonrated glazing and nonrated opening protectives per the exception to 39.1.2.2 shall be permitted between business occupancies and parking structures.

SECTION 39.4 SPECIAL PROVISIONS

39.4.1 Windowless or Underground Buildings. (See Section 11.7.)

39.4.2 High-Rise Buildings.

39.4.2.1 All high-rise business occupancy buildings shall be provided with a reasonable degree of safety from fire. Such degree of safety shall be accomplished by the installation of a complete, approved, supervised automatic sprinkler system in accordance with Section 9.7 or an engineered life safety system. An engineered life safety system shall be developed by a registered professional engineer who is experienced in fire and life safety systems design. The system shall be approved by the authority having jurisdiction and might include any or all of the following systems:

- (1) Partial automatic sprinkler protection
- (2) Smoke detection alarms
- (3) Smoke control
- (4) Compartmentation
- (5) Other approved systems

39.4.2.2* A limited but reasonable time shall be permitted for compliance with any part of 39.4.2.1, commensurate with the magnitude of expenditure and the disruption of services.

39.4.2.3 In addition to the requirements of 39.4.2, all buildings, regardless of height, shall comply with all other applicable provisions of this chapter.

SECTION 39.5 BUILDING SERVICES

39.5.1 Utilities. Utilities shall comply with the provisions of Section 9.1.

39.5.2 Heating, Ventilating, and Air Conditioning. Heating, ventilating, and air conditioning equipment shall comply with the provisions of Section 9.2.

39.5.3 Elevators, Escalators, and Conveyors. Elevators, escalators, and conveyors shall comply with the provisions of Section 9.4.

39.5.4 Rubbish Chutes, Incinerators, and Laundry Chutes. Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 9.5.

SECTION 39.6 RESERVED

SECTION 39.7 OPERATING FEATURES

39.7.1 Drills. In any business occupancy building occupied by more than 500 persons or more than 100 persons above or below the street level, employees and supervisory personnel shall be periodically instructed in accordance with Section 4.7 and shall hold drills periodically where practicable.

39.7.2 Extinguisher Training. Designated employees of business occupancies shall be periodically instructed in the use of portable fire extinguishers.

Chapter 40 INDUSTRIAL OCCUPANCIES

SECTION 40.1 GENERAL REQUIREMENTS

40.1.1 Application. The requirements of this chapter shall apply to both new and existing industrial occupancies. Industrial occupancies shall include factories making products of all kinds and properties used for operations such as processing, assembling, mixing, packaging, finishing or decorating, repairing, and similar operations. Incidental high hazard operations protected in accordance with Section 8.4 and 40.3.2 in occupancies containing low or ordinary hazard contents shall not be the basis for high hazard industrial occupancy classification.

40.1.2 Mixed Occupancies. In any building occupied for both industrial and other purposes, means of egress shall comply with 6.1.14.

40.1.3 Special Definitions. (None.)

40.1.4 Classification of Occupancy. (See 6.1.12.)

40.1.4.1 Subclassification of Industrial Occupancies. Each industrial occupancy shall be subclassified according to its use as follows.

(a) *General Industrial Occupancy.* A general industrial occupancy conducts ordinary and low hazard industrial operations in buildings of conventional design suitable for various types of industrial processes. Also included are multistory buildings where floors are occupied by different tenants or buildings suitable for such occupancy and, therefore, subject to possible use for types of industrial processes with a high density of employee population.

(b) *Special Purpose Industrial Occupancy.* A special purpose industrial occupancy conducts ordinary and low hazard industrial operations in buildings designed for, and suitable only for, particular types of operations. Such occupancy is characterized by a relatively low density of employee population, with much of the area occupied by machinery or equipment.

(c) **High Hazard Industrial Occupancy.* A high hazard industrial occupancy conducts industrial operations that use high hazard materials or processes or houses high hazard contents. Incidental high hazard operations in low or ordinary occupancies that are protected in accordance with Section 6.2 and 40.3.2 shall not be the basis for overall occupancy classification.

40.1.4.2 Changing from one subclassification of industrial occupancy to another shall be permitted only if the structure, building, or portion thereof conforms with the requirements of this chapter applying to new construction for the new use.

40.1.5 Classification of Hazard of Contents. Classification of hazard of contents shall be in accordance with Section 6.2.

40.1.6 Minimum Construction Requirements. (No requirements.)

40.1.7* Occupant Load. The occupant load, in number of persons for whom means of egress and other provisions are required, shall be determined on the basis of the occupant load factors of Table 7.3.1.2 that are characteristic of the use of the space or shall be determined as the maximum probable population of the space under consideration, whichever is greater.

SECTION 40.2 MEANS OF EGRESS REQUIREMENTS

40.2.1 General. Each required means of egress shall be in accordance with the applicable portions of Chapter 7.

40.2.2 Means of Egress Components.

40.2.2.1 Components of means of egress shall be limited to the types described in 40.2.2.2 through 40.2.2.13.

40.2.2.2 Doors.

40.2.2.2.1 Doors complying with 7.2.1 shall be permitted.

40.2.2.2.2 Delayed-egress locks complying with 7.2.1.6.1 shall be permitted.

40.2.2.2.3 Access-controlled egress doors complying with 7.2.1.6.2 shall be permitted.

40.2.2.2.4 Existing horizontal-sliding fire doors shall be permitted in the means of egress under the following conditions:

- (1) They are held open by fusible links.
- (2) The links are rated at not less than 165°F (74°C).
- (3) The fusible links are located not more than 10 ft (3 m) above the floor.
- (4) The fusible link is in immediate proximity to the door opening.
- (5) The fusible link is not located above a ceiling.
- (6) The door is not credited with providing any protection under this *Code*.

40.2.2.3 Stairs.

40.2.2.3.1 Stairs complying with 7.2.2 shall be permitted.

Exception No. 1: Noncombustible, grated stair treads and noncombustible, grated landing floors.

Exception No. 2: Industrial equipment access in accordance with 40.2.5.6.

40.2.2.3.2 Spiral stairs complying with 7.2.2.2.3 shall be permitted.

40.2.2.3.3 Existing winders complying with 7.2.2.2.4 shall be permitted.

40.2.2.4 Smokeproof Enclosures. Smokeproof enclosures complying with 7.2.3 shall be permitted.

40.2.2.5 Horizontal Exits.

40.2.2.5.1 Horizontal exits complying with 7.2.4 shall be permitted.

40.2.2.5.2* In horizontal exits where the doorway is protected by a fire door on each side of the wall in which it is located, one fire door shall be of the swinging type as provided in 7.2.4.3.6, and the other shall be permitted to be an automatic-sliding fire door that shall be kept open whenever the building is occupied.

40.2.2.6 Ramps. Ramps complying with 7.2.5 shall be permitted.
Exception: Industrial equipment access in accordance with 40.2.5.6.

40.2.2.7 Exit Passageways. Exit passageways complying with 7.2.6 shall be permitted.

40.2.2.8 Escalators and Moving Walks. Existing, previously approved escalators and moving walks complying with 7.2.7 and located within the required means of egress shall be permitted.

40.2.2.9 Fire Escape Stairs. Existing fire escape stairs complying with 7.2.8 shall be permitted.

40.2.2.10 Fire Escape Ladders. Fire escape ladders complying with 7.2.9 shall be permitted.

Exception: Fixed industrial stairs in accordance with the minimum requirements for fixed stairs in ANSI A1264.1, Safety Requirements for Workplace Floor and Wall Openings, Stairs and Railings Systems, shall be permitted where fire escape ladders are permitted in accordance with 7.2.9.1.

40.2.2.11 Slide Escapes. Approved slide escapes complying with 7.2.10 shall be permitted as components in 100 percent of the required means of egress for both new and existing high hazard industrial occupancies. Slide escapes shall be counted as means of egress only where regularly used in emergency egress drills so that occupants are familiar with their use through practice.

40.2.2.12 Alternating Tread Devices. Alternating tread devices complying with 7.2.11 shall be permitted.

40.2.2.13 Areas of Refuge. Areas of refuge complying with 7.2.12 shall be permitted.

40.2.3 Capacity of Means of Egress. The capacity of means of egress shall be in accordance with Section 7.3.

Exception: In special purpose industrial occupancies, means of egress shall be sized to accommodate the occupant load as determined in accordance with Table 7.3.1.2; spaces not subject to human occupancy because of the presence of machinery or equipment shall not be included.

40.2.4 Number of Means of Egress. (See also Section 7.4.)

40.2.4.1 Not less than two means of egress shall be provided from every story or section, and not less than one exit shall be reached without traversing another story.

Exception: In low and ordinary hazard industrial occupancies, a single means of egress shall be permitted from any story or section, provided that the exit can be reached within the distance permitted as common path of travel. (See 40.2.5.3.)

40.2.4.2 Floors or portions thereof with an occupant load of more than 500 shall have the minimum number of separate and remote means of egress specified by 7.4.1.2.

Exception: Existing buildings.

40.2.4.3 Areas with high hazard contents shall comply with Section 7.11.

40.2.5 Arrangement of Means of Egress.

40.2.5.1 Means of egress shall be arranged in accordance with Section 7.5.

40.2.5.2 Dead-end corridors in general industrial and special purpose industrial occupancies shall not exceed 50 ft (15 m).

40.2.5.3 Common paths of travel in general industrial and special purpose industrial occupancies shall not exceed 50 ft (15 m).

Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, common path of travel shall not exceed 100 ft (30 m).

40.2.5.4 Common paths of travel shall be prohibited in high hazard industrial occupancies.

Exception: As permitted by 7.11.3.

40.2.5.5 Ancillary Facilities.

40.2.5.5.1* Ancillary facilities shall be arranged to allow travel in independent directions after leaving the ancillary facility so

that both means of egress paths do not become compromised by the same fire or similar emergency.

Exception: Existing facilities.

40.2.5.5.2* Ancillary facilities in special purpose industrial occupancies where delayed evacuation is anticipated shall have not less than a 2-hour fire resistance-rated separation from the predominant industrial occupancy and shall have one means of egress that is separated from the predominant industrial occupancy by 2-hour fire resistance-rated construction.

Exception: Existing facilities.

40.2.5.6 Industrial equipment access walkways, platforms, ramps, and stairs that serve as a component of the means of egress from the involved equipment shall be permitted in accordance with the applicable provisions of Chapter 7 as modified by Table 40.2.5.6. Any such means of egress component shall serve not more than 20 people.

Table 40.2.5.6 Equipment Access Dimensional Criteria

Minimum horizontal dimension of any walkway, landing, or platform	22 in. (55.9 cm) clear
Minimum stair or ramp width	22 in. (55.9 cm) clear between rails
Minimum tread width	22 in. (55.9 cm) clear
Minimum tread depth	10 in. (25.4 cm)
Maximum riser height	9 in. (22.9 cm)
Maximum height between landings	12 ft (3.7 m)
Minimum headroom	6 ft 8 in. (203 cm)

40.2.6 Travel Distance to Exits.

40.2.6.1 Travel distance, measured in accordance with Section 7.6, shall not exceed 200 ft (60 m).

Exception No. 1: Travel distance shall not exceed 250 ft (76 m) in buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

Exception No. 2: As permitted by 40.2.6.2.

Exception No. 3: As permitted by 40.2.6.3.

Exception No. 4: Travel distance to exits in high hazard industrial occupancies shall not exceed 75 ft (23 m).

40.2.6.2 In low or ordinary hazard general industrial occupancies, travel distance shall not exceed 400 ft (122 m) if the following additional provisions are met in full:

- (1) Application shall be limited to one-story buildings.
- (2) *Smoke venting and heat venting shall be provided by engineered means or by building configuration to ensure that occupants are not overtaken by spread of fire or smoke within 6 ft (1.8 m) of floor level before they have time to reach exits.
- (3) Approved, supervised automatic sprinkler systems or other approved, supervised automatic fire extinguishing systems in accordance with Section 9.7 shall be provided.

40.2.6.3 In low or ordinary hazard special purpose industrial occupancies, travel distance shall not exceed 300 ft (91 m), or, if the building is protected throughout by a supervised auto-

matic sprinkler system in accordance with Section 9.7, travel distance shall not exceed 400 ft (122 m).

40.2.7 Discharge from Exits. Discharge from exits shall be in accordance with Section 7.7.

40.2.8 Illumination of Means of Egress. Means of egress shall be illuminated in accordance with Section 7.8.

Exception: Structures occupied only during daylight hours, with skylights or windows arranged to provide the required level of illumination on all portions of the means of egress during such hours.

40.2.9* Emergency Lighting. Emergency lighting shall be provided in accordance with Section 7.9.

Exception No. 1: Special purpose industrial occupancies without routine human habitation.

Exception No. 2: Structures occupied only during daylight hours, with skylights or windows arranged to provide the required level of illumination on all portions of the means of egress during such hours.

40.2.10 Marking of Means of Egress. Means of egress shall have signs in accordance with Section 7.10.

40.2.11 Special Means of Egress Features. (Reserved.)

SECTION 40.3 PROTECTION

40.3.1 Protection of Vertical Openings. Any vertical opening shall be enclosed or protected in accordance with 8.2.5.

Exception No. 1: In special purpose industrial and high hazard industrial occupancies where unprotected vertical openings exist and are necessary to manufacturing operations, such openings shall be permitted beyond the specified limits. This exception shall be permitted only where every floor level has direct access to one or more enclosed stairs or other exits protected against obstruction by any fire or smoke in the open areas connected by the unprotected vertical openings.

Exception No. 2: Existing open stairs, existing open ramps, and existing escalators shall be permitted where connecting only two floor levels.

Exception No. 3: Existing unprotected vertical openings in buildings with low or ordinary hazard contents that are protected throughout by an approved automatic sprinkler system in accordance with Section 9.7 shall be permitted, provided that the vertical opening does not serve as a required exit. Under the conditions of this exception, all required exits shall consist of outside stairs in accordance with 7.2.2, smokeproof enclosures in accordance with 7.2.3, or horizontal exits in accordance with 7.2.4.

Exception No. 4: Openings in accordance with 8.2.5.8 shall be permitted.

40.3.2* Protection from Hazards. Every high hazard industrial occupancy, operation, or process shall have approved, supervised automatic extinguishing systems in accordance with Section 9.7 or other protection appropriate to the particular hazard, such as explosion venting or suppression. Protection shall be provided for any area subject to an explosion hazard to minimize danger to occupants in case of fire or other emergency before they have time to use exits to escape. Activation of the fire extinguishing or suppression system shall initiate the required building fire alarm system in accordance with 40.3.4.3.4. Hazardous areas in industrial occupancies protected by approved automatic extinguishing systems in accordance with Section 9.7 shall be exempt from the smoke-resisting enclosure requirement of 8.4.1.2.

40.3.3 Interior Finish.

40.3.3.1 Interior finish shall be in accordance with Section 10.2.

40.3.3.2 Interior Wall and Ceiling Finish. Interior wall and ceiling finish complying with 10.2.3 shall be Class A, Class B, or Class C in operating areas and shall be as required by 7.1.4 in exit enclosures.

40.3.3.3 Interior Floor Finish. (No requirements.)

40.3.4 Detection, Alarm, and Communications Systems.

40.3.4.1 General. Industrial occupancies shall be provided with a fire alarm system in accordance with Section 9.6.

Exception: If the total capacity of the building is under 100 persons and fewer than 25 persons are above or below the level of exit discharge.

40.3.4.2 Initiation. Initiation of the required fire alarm system shall be by manual means in accordance with 9.6.2.1(1).

Exception No. 1: Initiation shall be permitted by means of an approved automatic fire detection system in accordance with 9.6.2.1(2) that provides protection throughout the building.

Exception No. 2: Initiation shall be permitted by means of an approved, supervised automatic sprinkler system in accordance with 9.6.2.1(3) that provides protection throughout the building.

40.3.4.3 Notification.

40.3.4.3.1 The required fire alarm system shall meet one of the following criteria:

- (1) It shall provide occupant notification in accordance with 9.6.3.
- (2) It shall sound an audible and visible signal in a constantly attended location for the purposes of initiating emergency action.

40.3.4.3.2 Positive alarm sequence in accordance with 9.6.3.4 shall be permitted.

40.3.4.3.3 Existing presignal systems in accordance with 9.6.3.3 shall be permitted.

40.3.4.3.4 In high hazard industrial occupancies as described in 40.1.4.1(c), the required fire alarm system shall automatically initiate an occupant evacuation alarm signal in accordance with 9.6.3.

40.3.5 Extinguishment Requirements. (None.)

40.3.6 Corridors. The provisions of 7.1.3.1 shall not apply.

SECTION 40.4 SPECIAL PROVISIONS

40.4.1 High-Rise Buildings. High-rise industrial occupancies shall comply with the automatic sprinkler requirements of 11.8.2.1.

Exception No. 1: Low hazard industrial occupancies.

Exception No. 2: Special purpose industrial occupancies.

Exception No. 3: Existing industrial occupancies.

SECTION 40.5 BUILDING SERVICES

40.5.1 Utilities. Utilities shall comply with the provisions of Section 9.1.

40.5.2 Heating, Ventilating, and Air Conditioning. Heating, ventilating, and air conditioning equipment shall comply with the provisions of Section 9.2.

40.5.3 Elevators, Escalators, and Conveyors. Elevators, escalators, and conveyors shall comply with the provisions of Section 9.4.

40.5.4 Rubbish Chutes, Incinerators, and Laundry Chutes. Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 9.5.

SECTION 40.6* SPECIAL PROVISIONS FOR AIRCRAFT SERVICING HANGARS

40.6.1 The requirements of Sections 40.1 through 40.5 shall be met, except as modified by 40.6.2 through 40.6.4.

40.6.2 Exits from aircraft servicing areas shall be provided at intervals not exceeding 150 ft (45 m) on all exterior walls. There shall be not less than two means of egress from each aircraft servicing area. Horizontal exits through interior fire walls

shall be provided at intervals not exceeding 100 ft (30 m) along the wall.

Exception: Dwarf, or "smash," doors used in doors that accommodate aircraft shall be permitted for compliance with these requirements.

40.6.3 Means of egress from mezzanine floors in aircraft servicing areas shall be arranged so that the travel distance to the nearest exit from any point on the mezzanine does not exceed 75 ft (23 m). Such means of egress shall lead directly to a properly enclosed stair discharging directly to the exterior, to a suitable cutoff area, or to outside stairs.

40.6.4 Dead ends shall not exceed 50 ft (15 m).

Exception: No dead end shall be permitted for high hazard contents areas.

Chapter 41 RESERVED

Chapter 42 STORAGE OCCUPANCIES

SECTION 42.1 GENERAL REQUIREMENTS

42.1.1 Application. The requirements of this chapter shall apply to both new and existing storage occupancies. Storage occupancies shall include all buildings or structures used primarily for the storage or sheltering of goods, merchandise, products, vehicles, or animals.

42.1.2 Mixed Occupancies. (See 6.1.14 and 42.1.4.)

42.1.3 Special Definitions. (None.)

42.1.4 Classification of Occupancy.

42.1.4.1 Storage occupancies shall include all buildings and structures or parts thereof with occupancy as defined in 6.1.13. Incidental storage in another occupancy shall not be the basis for overall occupancy classification.

42.1.4.2 Storage occupancies or areas of storage occupancies that are used for the purpose of packaging, labeling, sorting, special handling, or other operations requiring an occupant load greater than that normally contemplated for storage shall be classified as industrial occupancies. (See Chapter 40.)

42.1.5 Classification of Hazard of Contents. Contents of storage occupancies shall be classified as low hazard, ordinary hazard, or high hazard, in accordance with Section 6.2, depending on the character of the materials stored, their packaging, and other factors.

42.1.6 Minimum Construction Requirements. (No requirements.)

42.1.7* Occupant Load. The occupant load, in number of persons for whom means of egress and other provisions are required, shall be determined on the basis of the maximum probable population of the space under consideration.

SECTION 42.2 MEANS OF EGRESS REQUIREMENTS

42.2.1 General. Each required means of egress shall be in accordance with the applicable portions of Chapter 7.

42.2.2 Means of Egress Components.

42.2.2.1 Components of means of egress shall be limited to the types described in 42.2.2.2 through 42.2.2.12.

42.2.2.2 Doors.

42.2.2.2.1 Doors complying with 7.2.1 shall be permitted.

42.2.2.2.2 Delayed-egress locks complying with 7.2.1.6.1 shall be permitted.

42.2.2.2.3 Access-controlled egress doors complying with 7.2.1.6.2 shall be permitted.

42.2.2.2.4 Existing horizontal-sliding fire doors shall be permitted in the means of egress under the following conditions:

- (1) They are held open by fusible links.
- (2) The links are rated at not less than 165°F (74°C).
- (3) The fusible links are located not more than 10 ft (3 m) above the floor.

(4) The fusible link is in immediate proximity to the door opening.

(5) The fusible link is not located above a ceiling.

(6) The door is not credited with providing any protection under this Code.

42.2.2.3 Stairs.

42.2.2.3.1 Stairs complying with 7.2.2 shall be permitted.

42.2.2.3.2 Spiral stairs complying with 7.2.2.2.3 shall be permitted.

42.2.2.3.3 Existing winders complying with 7.2.2.2.4 shall be permitted.

42.2.2.4 Smokeproof Enclosures. Smokeproof enclosures complying with 7.2.3 shall be permitted.

42.2.2.5 Horizontal Exits.

42.2.2.5.1 Horizontal exits complying with 7.2.4 shall be permitted.

42.2.2.5.2* In horizontal exits where the doorway is protected by a fire door on each side of the wall in which it is located, one fire door shall be of the swinging type as provided in 7.2.4.3.6, and the other shall be permitted to be an automatic-sliding fire door that shall be kept open whenever the building is occupied.

42.2.2.6 Ramps. Ramps complying with 7.2.5 shall be permitted.

42.2.2.7 Exit Passageways. Exit passageways complying with 7.2.6 shall be permitted.

42.2.2.8 Fire Escape Stairs. Existing fire escape stairs complying with 7.2.8 shall be permitted.

42.2.2.9 Fire Escape Ladders. Fire escape ladders complying with 7.2.9 shall be permitted.

42.2.2.10 Slide Escapes. Existing slide escapes complying with 7.2.10 shall be permitted.

42.2.2.11 Alternating Tread Devices. Alternating tread devices complying with 7.2.11 shall be permitted.

42.2.2.12 Areas of Refuge. Areas of refuge complying with 7.2.12 shall be permitted.

42.2.3 Capacity of Means of Egress. The capacity of means of egress shall be in accordance with Section 7.3.

42.2.4 Number of Means of Egress. (See also Section 7.4.)

42.2.4.1 Every building or structure used for storage and every section thereof considered separately shall have not less than two separate means of egress as remotely located from each other as practicable.

Exception No. 1: In low hazard storage occupancies, a single means of egress shall be permitted from any story or section.

Exception No. 2: In ordinary hazard storage occupancies, a single means of egress shall be permitted from any story or section, provided that the exit can be reached within the distance permitted as common path of travel. (See 42.2.5.4.)

42.2.4.2 Floors or portions thereof with an occupant load of more than 500 persons shall have the minimum number of separate and remote means of egress specified by 7.4.1.2.

Exception: Existing buildings.

42.2.5 Arrangement of Means of Egress.

42.2.5.1 Means of egress shall be arranged in accordance with Section 7.5.

42.2.5.2 In storage occupancies with low hazard contents, dead-end corridors and common paths of travel shall be permitted without limitation.

42.2.5.3 In storage occupancies with ordinary hazard contents, dead-end corridors shall not exceed 50 ft (15 m).

Exception: Dead-end corridors shall not exceed 100 ft (30 m) in buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

42.2.5.4 In storage occupancies with ordinary hazard contents, common paths of travel shall not exceed 50 ft (15 m).

Exception: Common paths of travel shall not exceed 100 ft (30 m) in buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

42.2.5.5 Dead-end corridors and common paths of travel shall be prohibited in high hazard storage occupancies.

Exception: As permitted by 7.11.3.

42.2.6* Travel Distance to Exits. (See also Section 7.6.)

42.2.6.1 In low hazard storage occupancies, limitations on travel distance to exits shall not be required.

42.2.6.2 In ordinary hazard storage occupancies, travel distance shall not exceed 200 ft (60 m).

Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, travel distance shall not exceed 400 ft (122 m).

42.2.6.3 Every area used for the storage of high hazard commodities shall have an exit within 75 ft (23 m) of any point in the area where persons might be present.

Exception No. 1: In areas used for the storage of high hazard commodities that are protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, travel distance to an exit shall be within 100 ft (30 m) of any point in the area where persons might be present.

Exception No. 2: In storage occupancies where flammable and combustible liquid products are stored and protected in accordance with NFPA 30, Flammable and Combustible Liquids Code, travel distance to an exit shall be permitted to be not more than 150 ft (45 m).*

42.2.7 Discharge from Exits. Discharge from exits shall be in accordance with Section 7.7.

42.2.8 Illumination of Means of Egress. Means of egress shall be illuminated in accordance with Section 7.8.

Exception: In structures occupied only during daylight hours, with windows arranged to provide the required level of illumination on all portions of the means of egress during such hours, illumination requirements shall be permitted to be waived by the authority having jurisdiction.

42.2.9 Emergency Lighting. Emergency lighting shall be provided in accordance with Section 7.9.

Exception No. 1: Storage occupancies shall not require emergency lighting where not normally occupied.

Exception No. 2: In structures occupied only during daylight hours, with skylights or windows arranged to provide the required level of illumination on all portions of the means of egress during such hours, emergency lighting shall not be required.

42.2.10 Marking of Means of Egress. Means of egress shall have signs in accordance with Section 7.10.

42.2.11 Special Means of Egress Features. (Reserved.)

SECTION 42.3 PROTECTION

42.3.1 Protection of Vertical Openings. Any vertical opening shall be enclosed or protected in accordance with 8.2.5.

Exception No. 1: Existing, unprotected vertical openings in buildings with low or ordinary hazard contents that are protected throughout by an approved automatic sprinkler system in accordance with Section 9.7 shall be permitted where they do not serve as required exits. Under the conditions of this exception, all required exits shall consist of outside stairs in accordance with 7.2.2, smokeproof enclosures in accordance with 7.2.3, or horizontal exits in accordance with 7.2.4.

Exception No. 2: Vertical openings in accordance with 8.2.5.8 shall be permitted.

42.3.2 Protection from Hazards. (No requirements.) (See also Section 8.4.)

42.3.3 Interior Finish.

42.3.3.1 Interior finish shall be in accordance with Section 10.2.

42.3.3.2 Interior Wall and Ceiling Finish. Interior wall and ceiling finish complying with 10.2.3 shall be Class A, Class B, or Class C in storage areas and shall be as required by 7.1.4 in exit enclosures.

42.3.3.3 Interior Floor Finish. (No requirements.)

42.3.4 Detection, Alarm, and Communications Systems.

42.3.4.1 General. Storage occupancies shall be provided with a fire alarm system in accordance with Section 9.6.

Exception No. 1: Storage occupancies limited to low hazard contents.

Exception No. 2: Storage occupancies with ordinary or high hazard contents not exceeding an aggregate floor area of 100,000 ft² (9300 m²).

Exception No. 3: Storage occupancies protected throughout by approved automatic extinguishment protection.

42.3.4.2 Initiation. Initiation of the required fire alarm system shall be by manual means in accordance with 9.6.2.1(1).

Exception: Initiation shall be permitted by means of an approved automatic fire detection system in accordance with 9.6.2.1(2) that provides protection throughout the building.

42.3.4.3 Notification.

42.3.4.3.1 The required fire alarm system shall meet one of the following criteria:

- (1) It shall provide occupant notification in accordance with 9.6.3.
- (2) It shall sound an audible and visible signal in a constantly attended location for the purposes of initiating emergency action.

42.3.4.3.2 Positive alarm sequence in accordance with 9.6.3.4 shall be permitted.

42.3.4.3.3 Existing presignal systems in accordance with 9.6.3.3 shall be permitted.

42.3.4.3.4 In high hazard storage occupancies, the required fire alarm system shall automatically initiate an occupant evacuation alarm signal in accordance with 9.6.3.

42.3.5 Extinguishment Requirements. (None.)

42.3.6 Corridors. The provisions of 7.1.3.1 shall not apply.

SECTION 42.4 SPECIAL PROVISIONS

42.4.1 High-Rise Buildings. High-rise storage occupancies shall comply with the automatic sprinkler requirements of 11.8.2.1.

Exception No. 1: Low hazard storage occupancies.

Exception No. 2: Existing storage occupancies.

SECTION 42.5 BUILDING SERVICES

42.5.1 Utilities. Utilities shall comply with the provisions of Section 9.1.

42.5.2 Heating, Ventilating, and Air Conditioning. Heating, ventilating, and air conditioning equipment shall comply with the provisions of Section 9.2.

42.5.3 Elevators, Escalators, and Conveyors. Elevators, escalators, and conveyors shall comply with the provisions of Section 9.4.

42.5.4 Rubbish Chutes, Incinerators, and Laundry Chutes. Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 9.5.

SECTION 42.6* SPECIAL PROVISIONS FOR AIRCRAFT STORAGE HANGARS

42.6.1 The requirements of Sections 42.1 through 42.5 shall be met, except as modified by 42.6.2 through 42.6.4.

42.6.2 Exits from aircraft storage areas shall be provided at intervals not exceeding 150 ft (45 m) on all exterior walls. There shall be not less than two means of egress serving each aircraft storage area. Horizontal exits through interior fire walls shall be provided at intervals not exceeding 100 ft (30 m) along the wall.

Exception: Dwarf, or "smash," doors used in doors that accommodate aircraft shall be permitted for compliance with these requirements.

42.6.3 Means of egress from mezzanine floors in aircraft storage areas shall be arranged so that the travel distance to the nearest exit from any point on the mezzanine does not exceed 75 ft (23 m). Such means of egress shall lead directly to a properly enclosed stair discharging directly to the exterior, to a suitable cutoff area, or to outside stairs.

42.6.4 Dead ends shall not exceed 50 ft (15 m).

Exception: No dead end shall be permitted for high hazard contents areas.

SECTION 42.7* SPECIAL PROVISIONS FOR GRAIN OR OTHER BULK STORAGE ELEVATORS

42.7.1 The requirements of Sections 42.1 through 42.5 shall be met, except as modified by 42.7.2 through 42.7.4.

42.7.2 There shall be not less than two means of egress from all working levels of the head house. One of these means of egress shall be a stair to the level of exit discharge that is enclosed by a dust-resistant 1-hour fire resistance-rated enclosure in accordance with 7.1.3.2. The second means of egress shall be one of the following:

(1) An exterior stair or basket ladder-type fire escape accessible from all working levels of the head house that provides a passage to ground level

(2) An exterior stair or basket ladder-type fire escape accessible from all working levels of the head house that provides access to the top of adjoining structures and that provides a continuous path to the means of egress described in 42.7.3

Exception: Stair enclosures in existing structures shall be permitted to have non-fire-rated dust-resistant enclosures.

42.7.3 An exterior stair or basket ladder-type fire escape shall provide passage to ground level from the top of the end of an adjoining structure, such as a silo, conveyor, gallery, or gantry.

42.7.4 Underground Spaces.

42.7.4.1 Underground spaces shall have not less than two means of egress, one of which shall be permitted to be a means of escape. The means of escape shall be arranged to eliminate dead ends.

42.7.4.2 Travel distance to means of escape or exit shall not exceed 200 ft (60 m).

Exception No. 1: Existing facilities.

Exception No. 2: In a building protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, travel distance shall not exceed 400 ft (122 m).

SECTION 42.8 SPECIAL PROVISIONS FOR PARKING STRUCTURES

42.8.1 General Requirements.

42.8.1.1* Application. The following provisions shall apply to parking structures of the closed or open type, above or below ground, but shall not apply to mechanical or exclusively attendant-type parking facilities that are not occupied by customers. The requirements of Sections 42.1 through 42.7 shall not apply.

42.8.1.2 Mixed Occupancies.

42.8.1.2.1 Where both parking and repair operations are conducted in the same building, the entire building shall comply with Chapter 40.

Exception: If the parking and repair sections are separated by not less than 1-hour fire-rated construction, the parking and repair sections shall be permitted to be treated separately.

42.8.1.2.2 In areas where repair operations are conducted, the means of egress shall comply with Chapter 40.

42.8.1.3 Special Definition.

Open-Air Parking Structure. See 3.3.139.

42.8.1.4 Classification of Occupancy. Incidental vehicle parking in another occupancy shall not be the basis for overall occupancy classification.

42.8.1.5 Classification of Hazard of Contents. Parking structures used only for the storage of vehicles shall be classified as ordinary hazard in accordance with Section 6.2.

42.8.1.6 Minimum Construction Requirements. (No requirements.)

42.8.1.7 Occupant Load. (No requirements.)

42.8.2 Means of Egress Requirements.

42.8.2.1 General. Means of egress shall be in accordance with Chapter 7 and this section.

42.8.2.2 Means of Egress Components.

42.8.2.2.1 Components of means of egress shall be limited to the types described in 42.8.2.2.2 through 42.8.2.2.9.

42.8.2.2.2 Doors.

42.8.2.2.2.1 Doors complying with 7.2.1 shall be permitted.

42.8.2.2.2.2 Special locking arrangements complying with 7.2.1.6 shall be permitted.

42.8.2.2.2.3 An opening for the passage of automobiles shall be permitted to serve as an exit from a street floor, provided that no door or shutter is installed therein.

42.8.2.2.3 Stairs.

42.8.2.2.3.1 Stairs complying with 7.2.2 shall be permitted.

42.8.2.2.3.2 Existing winders complying with 7.2.2.4 shall be permitted.

42.8.2.2.3.3 Exception No. 2 to 7.2.2.4.6(3) shall not apply to guards for parking garages that are accessible to the general public.

42.8.2.2.4 Smokeproof Enclosures. Smokeproof enclosures complying with 7.2.3 shall be permitted.

42.8.2.2.5 Horizontal Exits. Horizontal exits complying with 7.2.4 shall be permitted.

42.8.2.2.6 Ramps.

42.8.2.2.6.1 Ramps complying with 7.2.5 shall be permitted and shall not be subject to normal vehicular traffic where used as an exit.

Exception No. 1: In a ramp-type open-air parking structure with open vehicle ramps not subject to closure, the ramp shall be permitted to serve in lieu of the second means of egress from floors above the level of exit discharge, provided that the ramp discharges directly outside at the street level.

Exception No. 2: For parking structures extending only one floor level below the level of exit discharge, a vehicle ramp leading directly to the outside shall be permitted to serve in lieu of the second means of egress, provided that no door or shutter is installed therein.

42.8.2.2.6.2 Exception No. 2 to 7.2.2.4.6(3) shall not apply to guards for parking garages that are accessible to the general public.

42.8.2.2.7 Exit Passageways. Exit passageways complying with 7.2.6 shall be permitted.

42.8.2.2.8 Fire Escape Stairs. Fire escape stairs complying with 7.2.8 shall be permitted for existing parking structures only.

42.8.2.2.9 Areas of Refuge. Areas of refuge complying with 7.2.12 shall be permitted.

42.8.2.3 Capacity of Means of Egress. (See also 42.8.2.4 and 42.8.2.5.)

42.8.2.4 Number of Means of Egress. (See also Section 7.4.)

42.8.2.4.1 Not less than two means of egress shall be provided from every floor or section of every parking structure.

42.8.2.4.2 Floors or portions thereof with an occupant load of more than 500 persons shall have the minimum number of separate and remote means of egress specified by 7.4.1.2.

Exception: Existing buildings.

42.8.2.5 Arrangement of Means of Egress. (See also Section 7.5.)

42.8.2.5.1 Means of egress shall be arranged so that, from any point in the parking structure, the paths of travel to the two exits are in different directions.

Exception: A common path of travel shall be permitted for the first 50 ft (15 m) from any point in the parking structure.

42.8.2.5.2 Dead ends shall not exceed 50 ft (15 m).

42.8.2.5.3 If fuel-dispensing devices are located within a parking structure, travel away from the fuel-dispensing device in any direction shall lead to an exit with no dead end in which occupants might be trapped by fire. Within closed parking structures, exits shall be arranged and located to meet the following additional requirements:

- (1) Exits shall lead to the outside of the building on the same level or to stairs; no upward travel shall be permitted unless direct outside exits are available from that floor.
- (2) Any story below that story at which fuel is being dispensed shall have exits leading directly to the outside via outside stairs or doors at ground level.

42.8.2.6 Travel Distance to Exits. Means of egress in parking structures shall be arranged so that no point is more than 150 ft (45 m), measured in accordance with Section 7.6, from the nearest exit.

Exception No. 1: Travel distance shall not exceed 300 ft (91 m) for open floors of nonsprinklered, open-air parking structures or 400 ft (120 m) in open-air parking structures protected throughout by an approved, supervised automatic sprinkler system.

Exception No. 2: Travel distance shall not exceed 200 ft (60 m) for enclosed parking structures protected throughout by an approved automatic sprinkler system in accordance with Section 9.7.

Exception No. 3: Travel distance in parking structures open not less than 50 percent on all sides shall not exceed 400 ft (120 m).

42.8.2.7 Discharge from Exits. Exit discharge shall comply with Section 7.7.

42.8.2.8 Illumination of Means of Egress. Parking structures shall be provided with illumination of means of egress in accordance with Section 7.8.

Exception: Structures occupied only during daylight hours, arranged to provide the required level of illumination of all portions of the means of egress by natural means, shall not require artificial illumination where permitted by the authority having jurisdiction.

42.8.2.9 Emergency Lighting. Parking structures shall be provided with emergency lighting in accordance with Section 7.9.

Exception: In structures occupied only during daylight hours, arranged to provide the required level of illumination of all portions of the means of egress by natural means, emergency lighting shall not be required.

42.8.2.10 Marking of Means of Egress. Means of egress shall have signs in accordance with Section 7.10.

42.8.2.11 Special Means of Egress Features. (Reserved.)

42.8.3 Protection.

42.8.3.1 Protection of Vertical Openings. (No requirements.)

42.8.3.2 Protection from Hazards. (No requirements.)

42.8.3.3 Interior Finish.

42.8.3.3.1 Interior finish shall be in accordance with Section 10.2.

42.8.3.3.2 Interior Wall and Ceiling Finish. Interior wall and ceiling finish complying with 10.2.3 shall be Class A, Class B, or Class C in parking structures and shall be as required by 7.1.4 in exit enclosures.

42.8.3.3.3 Interior Floor Finish. (No requirements.)

42.8.3.4 Detection, Alarm, and Communications Systems.

42.8.3.4.1 General. Parking structures exceeding an aggregate floor area of 100,000 ft² (9300 m²) shall be provided with a fire alarm system in accordance with Section 9.6.

Exception No. 1: Open-air parking structures.

Exception No. 2: Parking structures protected throughout by an approved automatic sprinkler system in accordance with Section 9.7.

42.8.3.4.2 Initiation. Initiation of the required fire alarm system shall be by manual means in accordance with 9.6.2.1(1).

Exception: Initiation shall be permitted by means of an approved automatic fire detection system in accordance with 9.6.2.1(2) that provides protection throughout the building.

42.8.3.4.3 Notification.

42.8.3.4.3.1 The required fire alarm system shall sound an audible alarm in a continuously attended location for purposes of initiating emergency action.

42.8.3.4.3.2 Positive alarm sequence in accordance with 9.6.3.4 shall be permitted.

42.8.3.4.3.3 Existing presignal systems in accordance with 9.6.3.3 shall be permitted.

42.8.3.5 Extinguishing Requirements. (None.)

42.8.3.6 Corridors. The provisions of 7.1.3.1 shall not apply.

42.8.4 Special Provisions.

42.8.4.1 High-Rise Buildings. (No requirements.)

42.8.5 Building Services.

42.8.5.1 Utilities. Utilities shall comply with the provisions of Section 9.1.

42.8.5.2 Heating, Ventilating, and Air Conditioning. Heating, ventilating, and air conditioning equipment shall comply with the provisions of Section 9.2, except as otherwise required in Section 42.8.

42.8.5.3 Elevators, Escalators, and Conveyors. Elevators, escalators, and conveyors shall comply with the provisions of Section 9.4.

42.8.5.4 Rubbish Chutes, Incinerators, and Laundry Chutes. Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 9.5.

ANNEX A EXPLANATORY MATERIAL

This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.

The following notes, bearing the same number as the text of the *Life Safety Code* to which they apply, contain useful explanatory material.

CHAPTER 1

A.1.2 The following is a suggested procedure for determining the *Code* requirements for a building or structure:

- (1) Determine the occupancy classification by referring to the occupancy definitions in Chapter 6 and the occupancy Chapters 12 through 42 (*see 6.1.14 for buildings with more than one use*).
- (2) Determine if the building or structure is new or existing (*see the definitions in Chapter 3*).
- (3) Determine the occupant load (*see 7.3.1*).
- (4) Determine the hazard of contents (*see Section 6.2*).
- (5) Refer to the applicable occupancy chapter of the *Code* (Chapters 12 through 42) (*see Chapters 1 through 4 and 6 through 11, as needed, for general information (such as definitions) or as directed by the occupancy chapter*).
- (6) Determine the occupancy subclassification or special use condition, if any, by referring to Chapters 18 and 19, health care occupancies; Chapters 22 and 23, detention and correctional occupancies; Chapters 28 and 29, hotels and dormitories; Chapters 32 and 33, residential board and care occupancies; and Chapters 36 and 37, mercantile occupancies, which contain subclassifications or special use definitions.
- (7) Proceed through the applicable occupancy chapter to verify compliance with each referenced section, subsection, paragraph, subparagraph, and referenced codes, standards, and other documents.
- (8) Where two or more requirements apply, the occupancy chapter generally takes precedence over the base Chapters 1 through 4 and 6 through 11.
- (9) Where two or more occupancy chapters apply, such as in a mixed occupancy (*see 6.1.14*), the most restrictive requirements apply.

A.1.2.1 The *Code* recognizes that panic in a burning building might be uncontrollable but deals with the potential panic hazard through measures designed to prevent the development of panic. Experience indicates that panic seldom develops, even in the presence of potential danger, as long as occupants of buildings are moving toward exits that they can see within a reasonable distance without obstructions or undue congestion in the path of travel. However, any uncertainty as to the location or adequacy of means of egress, the presence of smoke, or the stoppage of egress travel, such as might occur when one person stumbles and falls on the stairs, is potentially conducive to panic. The danger of panic is greatest when there are large numbers of people in a confined area.

A.1.2.4(1) This *Code* is intended to be adopted and used as part of a comprehensive program of building regulations that include building, mechanical, plumbing, electrical, fuel gas, fire prevention, and land use regulations.

A.1.3 The *Code* endeavors to avoid requirements that might involve unreasonable hardships or unnecessary inconvenience or interference with the normal use and occupancy of a building but provides for fire safety consistent with the public interest.

A.1.3.1 Protection of occupants is achieved by the combination of prevention, protection, egress, and other features with due regard to the capabilities and reliability of the features involved. The level of life safety from fire is defined through requirements directed at the following:

- (1) Prevention of ignition
- (2) Detection of fire
- (3) Control of fire development
- (4) Confinement of the effects of fire
- (5) Extinguishment of fire
- (6) Provision of refuge and/or evacuation facilities
- (7) Staff reaction
- (8) Provision of fire safety information to occupants

A.1.4 It is the intent of Section 1.4 that a building, addition, or alteration designed to meet the requirements of a prior edition of the *Code* be required to meet those requirements for the life of the building. It is intended that the initial assessment of the building, when new, should be based on new occupancy requirements for the edition of the *Code* in effect on the date of plan approval. Subsequent assessments of the building should be based on new occupancy requirements of that same edition of the *Code* for the life of the building. Requirements for existing buildings in this edition of the *Code* apply if those requirements are more restrictive.

There are some cases where the requirements for new construction are less restrictive, and it might be justified to permit an existing building to use the less restrictive requirements. However, extreme care needs to be exercised when granting such permission, because the less restrictive provision might be the result of a new requirement elsewhere in the *Code*. For example, in editions of the *Code* prior to 1991, corridors in new health care occupancies were required to have a 1-hour fire resistance rating. Since 1991, these corridors have been required only to resist the passage of smoke. However, this provision is based on the new requirement that all new health care facilities be protected throughout by automatic sprinklers.

A.1.4.1 In various chapters, there are specific provisions for existing buildings and structures that might differ from those for new construction.

A.1.5.1 Before a particular mathematical fire model or evaluation system is used, its purpose and limitations need to be known. The technical documentation should clearly identify any assumptions included in the evaluation. Also, it is the intent of the Committee on Safety to Life to recognize that future editions of this *Code* are a further refinement of this edition and earlier editions. The changes in future editions will reflect the continuing input of the fire protection/life safety community in its attempt to meet the purpose stated in this *Code*.

A.1.5.2 An equivalent method of protection provides an equal or greater level of safety. It is not a waiver or deletion of a *Code* requirement.

The prescriptive provisions of this *Code* provide specific requirements for broad classifications of buildings and structures. These requirements are stated in terms of fixed values, such as maximum travel distance, minimum fire resistance ratings, and minimum features of required systems, such as, detection, alarm, suppression, and ventilation, and not in terms of overall building or system performance.

However, the equivalency clause in 1.5.2 permits the use of alternative systems, methods, or devices to meet the intent of

the prescribed code provisions where approved as being equivalent. Equivalency provides an opportunity for a performance-based design approach. Through the rigor of a performance-based design, it can be demonstrated whether or not a building design is satisfactory and complies with the implicit or explicit intent of the applicable code requirement.

When employing the equivalency clause, it is important to clearly identify the prescriptive-based code provision being addressed (scope), to provide an interpretation of the intent of the provision (goals and objectives), to provide an alternative approach (proposed design), and to provide appropriate support for the suggested alternative (evaluation of proposed designs).

Performance resulting from proposed designs can be compared to the performance of the design features required by this *Code*. Using prescribed features as a baseline for comparison, it can then be demonstrated in the evaluation whether a proposed design offers the intended level of performance. A comparison of safety provided can be used as the basis for establishing equivalency.

CHAPTER 3

A.3.2.1 Approved. The National Fire Protection Association does not approve, inspect, or certify any installations, procedures, equipment, or materials; nor does it approve or evaluate testing laboratories. In determining the acceptability of installations, procedures, equipment, or materials, the authority having jurisdiction may base acceptance on compliance with NFPA or other appropriate standards. In the absence of such standards, said authority may require evidence of proper installation, procedure, or use. The authority having jurisdiction may also refer to the listings or labeling practices of an organization that is concerned with product evaluations and is thus in a position to determine compliance with appropriate standards for the current production of listed items.

A.3.2.2 Authority Having Jurisdiction. The phrase “authority having jurisdiction” is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction. In many circumstances, the property owner or his or her designated agent assumes the role of the authority having jurisdiction; at government installations, the commanding officer or departmental official may be the authority having jurisdiction.

A.3.2.3 Code. The decision to designate a standard as a “code” is based on such factors as the size and scope of the document, its intended use and form of adoption, and whether it contains substantial enforcement and administrative provisions.

A.3.2.5 Listed. The means for identifying listed equipment may vary for each organization concerned with product evaluation; some organizations do not recognize equipment as listed unless it is also labeled. The authority having jurisdiction should utilize the system employed by the listing organization to identify a listed product.

A.3.3.6 Aisle Accessway. *Aisle accessway* is the term used for the previously unnamed means of egress component leading to an aisle or other means of egress. For example, circulation space between parallel rows of seats having a width of 1 ft to 2 ft (0.3 m to 0.6 m) and a length not exceeding 100 ft (30 m) is an aisle accessway. Some of the circulation space between tables or seats in restaurants might be considered aisle accessway.

Depending on the width of aisle accessway, which is influenced by its length and expected utilization, the movement of a person through the aisle accessway might require others to change their individual speed of movement, alter their postures, move their chairs out of the way, or proceed ahead of the person.

A.3.3.14 Area of Refuge. An area of refuge has a temporary use during egress. It generally serves as a staging area that provides relative safety to its occupants while potential emergencies are assessed, decisions are made, and mitigating activities are begun. Taking refuge within such an area is, thus, a stage of the total egress process; a stage between egress from the immediately threatened area and egress to a public way.

An area of refuge might be another building connected by a bridge or balcony, a compartment of a subdivided story, an elevator lobby, or an enlarged story-level exit stair landing. An area of refuge is accessible by means of horizontal travel or, as a minimum, via an accessible route meeting the requirements of CABO/ANSI A117.1, *American National Standard for Accessible and Usable Buildings and Facilities*.

This *Code* recognizes any floor in a building protected throughout by an approved, supervised automatic sprinkler system as an area of refuge. This recognition acknowledges the ability of a properly designed and functioning automatic sprinkler system to control a fire at its point of origin and to limit the production of toxic products to a level that is not life threatening.

The requirement for separated rooms or spaces can be met on an otherwise undivided floor by enclosing the elevator lobby with ordinary glass or other simple enclosing partitions that are smoke resisting.

For some occupancies, one accessible room or space is permitted.

A.3.3.18 Atrium. As defined in NFPA 92B, *Guide for Smoke Management Systems in Malls, Atria, and Large Areas*, a large-volume space is an uncomparted space, generally two or more stories in height, within which smoke from a fire either in the space or in a communicating space can move and accumulate without restriction. Atria and covered malls are examples of large-volume spaces.

A.3.3.20 Barrier, Smoke. A smoke barrier might be vertically or horizontally-aligned, such as a wall, floor, or ceiling assembly. A smoke barrier might or might not have a fire resistance rating. Application of smoke barrier criteria where required elsewhere in the *Code* should be in accordance with Section 8.3.

A.3.3.21 Barrier, Thermal. Finish ratings, as published in the *UL Fire Resistance Directory*, are one way of determining thermal barrier.

A.3.3.22 Birth Center. A birth center is a low-volume service for healthy, childbearing women, and their families, who are capable of ambulation in the event of fire or fire-threatening events. Birth center mothers and babies have minimal analgesia, no general or regional anesthesia, and are capable of ambulation, even in second-stage labor.

A.3.3.25 Building. The term *building* is to be understood as if followed by the words *or portions thereof*. (See also *Structure*, A.3.3.197).

A.3.3.25.1 Building, Apartment. The *Code* specifies, that wherever there are three or more living units in a building, the building is considered an apartment building and is required to comply with either Chapter 30 or 31, as appropriate. Townhouse units are considered to be apartment buildings if there are three or more units in the building. The type of wall required between units in order to consider them to be separate buildings is normally established by the authority having jurisdiction. If the units are separated by a wall of sufficient fire resistance and structural integrity to be considered as separate buildings, then the provisions of Chapter 24 apply to each townhouse. Condominium status is a form of ownership, not occupancy; for example, there are condominium warehouses, condominium apartments, and condominium offices.

A.3.3.25.3 Building, Covered Mall. Covered mall buildings are occupied primarily by mercantile occupancies. However, they can include other occupancies such as drinking and dining establishments, entertainment and amusement facilities, offices, and similar uses that are incidental to the primary use of the building.

A.3.3.25.4 Building, Existing. With respect to judging whether a building should be considered existing, the deciding factor is not when the building was designed or when construction started but, rather, the date plans were approved for construction by the appropriate authority having jurisdiction.

A.3.3.25.5 Building, Flexible Plan and Open Plan Educational or Day-Care. Flexible plan buildings have movable corridor walls and movable partitions of full-height construction with doors leading from rooms to corridors. Open plan buildings have rooms and corridors delineated by tables, chairs, desks, bookcases, counters, low-height partitions, or similar furnishings. It is the intent that low-height partitions not exceed 5 ft (1.5 m).

A.3.3.25.6 Building, High-Rise. It is the intent of this definition that, in determining the level from which the highest occupiable floor is to be measured, the enforcing agency should exercise reasonable judgment, including consideration of overall accessibility to the building by fire department personnel and vehicular equipment. Where a building is situated on a sloping terrain and there is building access on more than one level, the enforcing agency might select the level that provides the most logical and adequate fire department access.

A.3.3.25.7 Building, Historic. Designation for a historic building might be in an official national, regional, or local historic register, listing, or inventory.

A.3.3.25.8 Building, Special Amusement. Such structures include amusements such as a haunted house, a roller coaster-type ride within a building, a multilevel play structure within a building, a submarine ride, and similar amusements where the occupants are not in the open air.

A.3.3.32 Common Path of Travel. Common path of travel is measured in the same manner as travel distance but terminates at that point where two separate and distinct routes become available. Paths that merge are common paths of travel.

A.3.3.37 Critical Radiant Flux. Critical radiant flux is the property determined by the test procedure of NFPA 253, *Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source*. The unit of measurement of critical radiant flux is watts per square centimeter (W/cm^2).

A.3.3.39 Day-Care Home. A day-care home is generally located within a dwelling unit.

A.3.3.42 Design Specifications. Design specifications include both hardware and human factors, such as the conditions produced by maintenance and training. For purposes of performance-based design, the design specifications of interest are those that affect the ability of the building to meet the stated goals and objectives.

A.3.3.46 Dormitory. Rooms within dormitories intended for the use of individuals for combined living and sleeping purposes are guest rooms or guest suites. Examples of dormitories are college dormitories, fraternity and sorority houses, and military barracks.

A.3.3.50 Electroluminescent. This light source is typically contained inside the device.

A.3.3.56 Evacuation Capability. The evacuation capability of the residents and staff is a function of both the ability of the residents to evacuate and the assistance provided by the staff. It is intended that the evacuation capability be determined by the procedure acceptable to the authority having jurisdiction. It is also intended that the timing of drills, the rating of residents, and similar actions related to determining the evacuation capability be performed by persons approved by or acceptable to the authority having jurisdiction. The evacuation capability can be determined by the use of the definitions in 3.3.54, 3.3.140, 3.3.203, 3.3.205, 3.3.210, and 3.3.212, the application of NFPA 101A, *Guide on Alternative Approaches to Life Safety*, Chapter 5, or a program of drills (timed).

Where drills are used in determining evacuation capability, it is suggested that the facility conduct and record fire drills six times per year on a bimonthly basis, with a minimum of two drills conducted during the night when residents are sleeping, and that the facility conduct the drills in consultation with the authority having jurisdiction. Records should indicate the time taken to reach a point of safety, date and time of day, location of simulated fire origin, escape paths used, and comments relating to residents who resisted or failed to participate in the drills.

Translation of drill times to evacuation capability is determined as follows:

- (1) 3 minutes or less — prompt
- (2) Over 3 minutes, but not in excess of 13 minutes — slow
- (3) More than 13 minutes — impractical

Evacuation capability, in all cases, is based on the time of day or night when evacuation of the facility would be most difficult, such as, when residents are sleeping or fewer staff are present.

Evacuation capability determination is considered slow if the following conditions are met:

- (1) All residents are able to travel to centralized dining facilities without continuous staff assistance.
- (2) There is continuous staffing whenever there are residents in the facility.

A.3.3.59 Existing. See *Building, Existing*, A.3.3.25.4.

A.3.3.61 Exit. Exits include exterior exit doors, exit passageways, horizontal exits, exit stairs, and exit ramps. In the case of a stairway, the exit includes the stair enclosure, the door to the stair enclosure, stairs and landings inside the enclosure, the door from the stair enclosure to the outside or to the level of exit discharge, and any exit passageway and its associated doors if such are provided so as to discharge the stair directly to the outside. In the case of a door leading directly from the street floor to the street or open air, the exit comprises only the door.

Doors of small individual rooms, as in hotels, while constituting exit access from the room, are not referred to as exits except where they lead directly to the outside of the building from the street floor.

A.3.3.61.1 Exit, Horizontal. Horizontal exits should not be confused with egress through doors in smoke barriers. Doors in smoke barriers are designed only for temporary protection against smoke, whereas horizontal exits provide protection against serious fire for a relatively long period of time in addition to providing immediate protection from smoke. (See 7.2.4.)

A.3.3.66 Exposure Fire. An exposure fire usually refers to a fire that starts outside a building, such as a wildlands fire or vehicle fire, and that consequently exposes the building to a fire.

A.3.3.69 Fire Barrier. A fire barrier might be vertically- or horizontally-aligned, such as a wall or floor assembly.

A.3.3.71 Fire Compartment. Additional fire compartment information is contained in 8.2.2.

In the provisions for fire compartments utilizing the outside walls of a building, it is not intended that the outside wall be specifically fire resistance-rated unless required by other standards. Likewise, it is not intended for outside windows or doors to be protected, unless specifically required for exposure protection by another section of this *Code* or by other standards.

A.3.3.73 Fire Model. Due to the complex nature of the principles involved, models are often packaged as computer software. Any relevant input data, assumptions, and limitations needed to properly implement the model will be attached to the fire models.

A.3.3.76 Fire Scenario. A fire scenario defines the conditions under which a proposed design is expected to meet the fire safety goals. Factors typically include fuel characteristics, ignition sources, ventilation, building characteristics, and occupant locations and characteristics. The term *fire scenario* includes more than the characteristics of the fire itself but excludes design specifications and excludes any characteristics that do not vary from one fire to another; the latter are called assumptions. The term *fire scenario* is used here to mean only those specifications required to calculate the fire's development and effects but, in other contexts, the term might be used to mean both the initial specifications and the subsequent development and effects (that is, a complete description of fire from conditions prior to ignition to conditions following extinguishment).

A.3.3.77 Fire Watch. Duties of the fire watch might include notifying the fire department and building occupants of an emergency, preventing a fire from occurring, or extinguishing small fires.

A.3.3.78 Flame Spread. See Section 10.2.

A.3.3.79 Flashover. Flashover occurs when the surface temperatures of combustible contents rise, producing pyrolysis gases, and the room heat flux becomes sufficient to heat all such gases to their ignition temperatures.

A.3.3.81 Floor Area, Gross. Where the term *floor area* is used, it should be understood to be gross floor area unless otherwise specified.

A.3.3.86 Fuel Load. Fuel load includes interior finish and trim.

A.3.3.89 Grandstand. Where the term *grandstand* is preceded by an adjective denoting a material, it means a grandstand the essential members of which, exclusive of seating, are of the material designated.

A.3.3.99 Heat Release Rate (HRR). The heat release rate of a fuel is related to its chemistry, physical form, and availability of oxidant and is ordinarily expressed as British thermal units per second (Btu/s) or kilowatts (kW).

Chapter 40 and Chapter 42 include detailed provisions on high hazard occupancy.

A.3.3.105 Hotel. So-called apartment hotels should be classified as hotels because they are potentially subject to the same transient occupancy as hotels. Transients are those who occupy accommodations for less than 30 days.

A.3.3.106 Illuminated, Externally. The light source is typically a dedicated incandescent or fluorescent source.

A.3.3.107 Illuminated, Internally. The light source is typically incandescent, fluorescent, electroluminescent, photoluminescent, light-emitting diodes, or self-luminous.

A.3.3.112 Interior Finish. Interior finish is not intended to apply to surfaces within spaces such as those that are concealed or inaccessible. Furnishings that, in some cases, might be secured in place for functional reasons should not be considered as interior finish.

A.3.3.112.2 Interior Floor Finish. Interior floor finish includes coverings applied over a normal finished floor or stair treads and risers.

A.3.3.117 Limited Care Facility. Limited care facilities and residential board and care occupancies both provide care to people with physical and mental limitations. However, the goals and programs of the two types of occupancies differ greatly. The requirements in this *Code* for limited care facilities are based on the assumption that these are medical facilities, that they provide medical care and treatment, and that the patients are not trained to respond to the fire alarm; that is, the patients do not participate in fire drills but, rather, they await rescue. (See Section 18.7.)

The requirements for residential board and care occupancies are based on the assumption that the residents are provided with personal care and activities that foster continued independence, that the residents are encouraged and taught to overcome their limitations, and that most residents, including all residents in prompt and slow homes, are trained to respond to fire drills, to the extent they are able. Residents are required to participate in fire drills. (See Section 32.7.)

A.3.3.118 Limited-Combustible. Materials subject to increase in combustibility or flame spread index beyond the limits herein established through the effects of age, moisture, or other atmospheric condition are considered combustible. See NFPA 259, *Standard Test Method for Potential Heat of Building Materials*, and NFPA 220, *Standard on Types of Building Construction*.

A.3.3.121 Means of Egress. A means of egress comprises the vertical and horizontal travel and includes intervening room spaces, doorways, hallways, corridors, passageways, balconies, ramps, stairs, elevators, enclosures, lobbies, escalators, horizontal exits, courts, and yards.

A.3.3.133 Objective. Objectives define a series of actions necessary to make the achievement of a goal more likely. Objectives are stated in more specific terms than goals and are measured on a more quantitative, rather than qualitative, basis.

A.3.3.134.2 Occupancy, Assembly. Assembly occupancies might include the following:

- (1) Armories
- (2) Assembly halls
- (3) Auditoriums
- (4) Bowling lanes
- (5) Club rooms
- (6) College and university classrooms, 50 persons and over
- (7) Conference rooms
- (8) Courtrooms
- (9) Dance halls
- (10) Drinking establishments
- (11) Exhibition halls
- (12) Gymnasiums
- (13) Libraries
- (14) Mortuary chapels
- (15) Motion picture theaters
- (16) Museums
- (17) Passenger stations and terminals of air, surface, underground, and marine public transportation facilities
- (18) Places of religious worship
- (19) Pool rooms
- (20) Recreation piers
- (21) Restaurants
- (22) Skating rinks
- (23) Special amusement buildings regardless of occupant load
- (24) Theaters

Assembly occupancies are characterized by the presence or potential presence of crowds with attendant panic hazard in case of fire or other emergency. They are generally open or occasionally open to the public, and the occupants, who are present voluntarily, are not ordinarily subject to discipline or control. Such buildings are ordinarily occupied by able-bodied persons and are not used for sleeping purposes. Special conference rooms, snack areas, and other areas incidental to, and under the control of, the management of other occupancies, such as offices, fall under the 50-person limitation.

Restaurants and drinking establishments with an occupant load of fewer than 50 persons should be classified as mercantile occupancies.

For special amusement buildings, see 12.4.7 and 13.4.7.

A.3.3.134.3 Occupancy, Business. Business occupancies include the following:

- (1) Air traffic control towers (ATCTs)
- (2) City halls
- (3) College and university instructional buildings, classrooms under 50 persons, and instructional laboratories
- (4) Courthouses
- (5) Dentists' offices
- (6) Doctors' offices
- (7) General offices

- (8) Outpatient clinics, ambulatory
- (9) Town halls

Doctors' and dentists' offices are included, unless of such character as to be classified as ambulatory health care occupancies. (See 3.3.8.)

Birth centers occupied by fewer than four patients, not including infants, at any one time; not providing sleeping facilities for four or more occupants; and not providing treatment procedures that render four or more patients, not including infants, incapable of self-preservation at any one time should be classified as business occupancies. For birth centers occupied by patients not meeting these parameters, see Chapter 18 or Chapter 19, as appropriate.

Service facilities common to city office buildings such as newsstands, lunch counters serving fewer than 50 persons, barber shops, and beauty parlors are included in the business occupancy group.

City halls, town halls, and court houses are included in this occupancy group insofar as their principal function is the transaction of public business and the keeping of books and records. Insofar as they are used for assembly purposes, they are classified as assembly occupancies.

A.3.3.134.4 Occupancy, Day-Care. Day-care occupancies include the following:

- (1) Adult day-care occupancies, except where part of a health care occupancy
- (2) Child day-care occupancies
- (3) Day-care homes
- (4) Kindergarten classes that are incidental to a child day-care occupancy
- (5) Nursery schools

In areas where public schools offer only half-day kindergarten programs, many child day-care occupancies offer state-approved kindergarten classes for children who need full-day care. As these classes are normally incidental to the day-care occupancy, the requirements of the day-care occupancy should be followed.

A.3.3.134.5 Occupancy, Detention and Correctional. Detention and correctional occupancies include the following:

- (1) Adult and juvenile substance abuse centers
- (2) Adult and juvenile work camps
- (3) Adult community residential centers
- (4) Adult correctional institutions
- (5) Adult local detention facilities
- (6) Juvenile community residential centers
- (7) Juvenile detention facilities
- (8) Juvenile training schools

A.3.3.134.6 Occupancy, Educational. Educational occupancies include the following:

- (1) Academies
- (2) Kindergartens
- (3) Schools

An educational occupancy is distinguished from an assembly occupancy in that the same occupants are regularly present.

A.3.3.134.7 Occupancy, Health Care. Health care occupancies include the following:

- (1) Ambulatory health care facilities
- (2) Hospitals
- (3) Limited care facilities

(4) Nursing homes

Occupants of health care occupancies typically have physical or mental illness, disease, or infirmity. They also include infants, convalescents, or infirm aged persons.

A.3.3.134.8 Occupancy, Industrial. Industrial occupancies include the following:

- (1) Dry cleaning plants
- (2) Factories of all kinds
- (3) Food processing plants
- (4) Gas plants
- (5) Hangars (for servicing/maintenance)
- (6) Laundries
- (7) Power plants
- (8) Pumping stations
- (9) Refineries
- (10) Sawmills
- (11) Telephone exchanges

In evaluating the appropriate classification of laboratories, the authority having jurisdiction should treat each case individually based on the extent and nature of the associated hazards. Some laboratories are classified as occupancies other than industrial; for example, a physical therapy laboratory or a computer laboratory.

A.3.3.134.8.1 Occupancy, Industrial, General. General industrial occupancies include multistory buildings where floors are occupied by different tenants or buildings suitable for such occupancy and, therefore, are subject to possible use for types of industrial processes with a high density of employee population.

A.3.3.134.8.2 Occupancy, Industrial, High Hazard. A high hazard occupancy includes occupancies where gasoline and other flammable liquids are handled, used, or stored under such conditions that involve possible release of flammable vapors; where grain dust, wood flour or plastic dusts, aluminum or magnesium dust, or other explosive dusts are produced; where hazardous chemicals or explosives are manufactured, stored, or handled; where cotton or other combustible fibers are processed or handled under conditions that might produce flammable flyings; and where other situations of similar hazard exist. Chapter 40 and Chapter 42 include detailed provisions on high hazard occupancy.

A.3.3.134.9 Occupancy, Mercantile. Mercantile occupancies include the following:

- (1) Auction rooms
- (2) Department stores
- (3) Drugstores
- (4) Restaurants with fewer than 50 persons
- (5) Shopping centers
- (6) Supermarkets

Office, storage, and service facilities incidental to the sale of merchandise and located in the same building should be considered part of the mercantile occupancy classification.

A.3.3.134.10 Occupancy, Mixed. With only a few exceptions, the *Code* sets no specific occupancy separation requirements. The authority having jurisdiction determines the separation needed, if any, based on 6.1.14 and subsection __.1.2 of each occupancy chapter. The local building code or the model building codes might be consulted by the authority having jurisdiction in making this determination, keeping life safety rather than property protection in mind.

A.3.3.134.12 Occupancy, Residential. Residential occupancies are treated as separate occupancies in this *Code* as follows:

- (1) One- and two-family dwellings (Chapter 24)
- (2) Lodging or rooming houses (Chapter 26)
- (3) Hotels, motels, and dormitories (Chapters 28 and 29)
- (4) Apartment buildings (Chapters 30 and 31)

A.3.3.134.13 Occupancy, Residential Board and Care. The following are examples of facilities that are classified as residential board and care occupancies:

- (1) A group housing arrangement for physically or mentally handicapped persons who normally attend school in the community, attend worship in the community, or otherwise use community facilities
- (2) A group housing arrangement for physically or mentally handicapped persons who are undergoing training in preparation for independent living, for paid employment, or for other normal community activities
- (3) A group housing arrangement for the elderly that provides personal care services but that does not provide nursing care
- (4) Facilities for social rehabilitation, alcoholism, drug abuse, or mental health problems that contain a group housing arrangement and that provide personal care services but do not provide acute care
- (5) Assisted living facilities
- (6) Other group housing arrangements that provide personal care services but not nursing care

A.3.3.134.14 Occupancy, Storage. Storage occupancies include the following:

- (1) Barns
- (2) Bulk oil storage
- (3) Cold storage
- (4) Freight terminals
- (5) Grain elevators
- (6) Hangars (for storage only)
- (7) Parking structures
- (8) Stables
- (9) Truck and marine terminals
- (10) Warehouses

Storage occupancies are characterized by the presence of relatively small numbers of persons in proportion to the area.

A.3.3.141 Outside Stair. See 7.2.2.

A.3.3.143 Performance Criteria. Performance criteria are stated in engineering terms. Engineering terms include temperatures, radiant heat flux, and levels of exposure to fire products. Performance criteria provide threshold values used to evaluate a proposed design.

A.3.3.145 Personal Care. Personal care involves responsibility for the safety of the resident while inside the building. Personal care might include daily awareness by the management of the resident's functioning and whereabouts, making and reminding a resident of appointments, the ability and readiness for intervention in the event of a resident experiencing a crisis, supervision in the areas of nutrition and medication, and actual provision of transient medical care.

A.3.3.146 Photoluminescent. The light source is considered internally illuminated.

A.3.3.148 Plastic, Cellular or Foamed. Cellular or foamed plastic might contain foamed and unfoamed polymeric or

monomeric precursors (prepolymer, if used), plasticizers, fillers, extenders, catalysts, blowing agents, colorants, stabilizers, lubricants, surfactants, pigments, reaction control agents, processing aids, and flame retardants.

A.3.3.149 Platform. Platforms also include the head tables for special guests; the raised area for lecturers and speakers; boxing and wrestling rings; theater-in-the-round; and for similar purposes wherein there are no overhead drops, pieces of scenery, or stage effects other than lighting and a screening valance. A platform is not intended to be prohibited from using a curtain as a valance to screen or hide the electric conduit, lighting track, or similar fixtures, nor is a platform prohibited from using curtains that are used to obscure the back wall of the stage; a curtain between the auditorium and the stage (grand or house curtain), a maximum of four leg drops; or a valance to screen light panels, plumbing, and similar equipment from view.

A.3.3.155 Proposed Design. The design team might develop a number of trial designs that will be evaluated to determine if they meet the performance criteria. One of the trial designs will be selected from those that meet the performance criteria for submission to the authority having jurisdiction as the proposed design.

The proposed design is not necessarily limited to fire protection systems and building features. It also includes any component of the proposed design that is installed, established, or maintained for the purpose of life safety, without which the proposed design could fail to achieve specified performance criteria. Therefore, the proposed design often includes emergency procedures and organizational structures that are needed to meet the performance criteria specified for the proposed design.

A.3.3.158 Ramp. See 7.2.5.

A.3.3.171 Seating, Festival. Festival seating describes situations in assembly occupancies where live entertainment events are held that are expected to result in overcrowding and high audience density that can compromise public safety. It is not the intent to apply the term *festival seating* to exhibitions; sports events; dances; conventions; and bona fide political, religious, and educational events. Assembly occupancies with 15 ft² (1.4 m²) or more per person should not be considered festival seating.

A.3.3.175 Self-Luminous. An example of a self-contained power source is tritium gas. Batteries do not qualify as a self-contained power source. The light source is typically contained inside the device.

A.3.3.176 Self-Preservation (Day-Care Occupancy). Examples of clients who are incapable of self-preservation include infants, clients who are unable to use stairs because of confinement to a wheelchair or other physical disability, and clients who cannot follow directions or a group to the outside of a facility due to mental or behavioral disorders. It is the intent of this *Code* to classify children under the age of 24 months as incapable of self-preservation. Examples of direct intervention by staff members include carrying a client, pushing a client outside in a wheelchair, and guiding a client by direct hand-holding or continued bodily contact. If clients cannot exit the building by themselves with minimal intervention from staff members, such as verbal orders, classification as incapable of self-preservation should be considered.

A.3.3.183 Smoke Compartment. In the provision of smoke compartments using the outside walls or the roof of a building, it is not intended that outside walls or roofs or any openings therein be capable of resisting the passage of smoke. Application of smoke compartment criteria where required elsewhere in the *Code* should be in accordance with Section 8.3.

A.3.3.185 Smoke Partition. A smoke partition is not required to have a fire resistance rating.

A.3.3.186 Smokeproof Enclosure. For further guidance, see the following publications:

- (1) ASHRAE *Handbook and Product Directory — Fundamentals*
- (2) *Design of Smoke Management Systems*, by Klote and Milke
- (3) NFPA 105, *Recommended Practice for the Installation of Smoke-Control Door Assemblies*

A.3.3.194.1 Story, Occupiable. Stories used exclusively for mechanical equipment rooms, elevator penthouses, and similar spaces are not occupiable stories.

A.3.3.196 Street Floor. Where, due to differences in street levels, there are two or more stories accessible from the street, each is a street floor. Where there is no floor level within the specified limits for a street floor above or below ground level, the building has no street floor.

A.3.3.197 Structure. The term *structure* is to be understood as if followed by the words *or portion thereof*. (See also *Building*, A.3.3.25.)

A.3.3.197.2 Structure, Air-Supported. A cable-restrained air-supported structure is one in which the uplift is resisted by cables or webbing that is anchored by various methods to the membrane or that might be an integral part of the membrane. It is not a tensioned-membrane structure.

A.3.3.197.5 Structure, Open. Open structures are often found in oil refining, chemical processing, or power plants. Roofs or canopies without enclosing walls are not considered an enclosure.

A.3.3.197.10 Structure, Underground. In determining openings in exterior walls, doors or access panels are permitted to be included. Windows are also permitted to be included if they are openable or provide a breakable glazed area.

A.3.3.201 Tent. A tent might also include a temporary tensioned-membrane structure.

CHAPTER 4

A.4.1 The goals in Section 4.1 reflect the scope of this *Code* (see *Section 1.2*). Other fire safety goals that are outside the scope of this *Code* might also need to be considered, such as property protection and continuity of operations. Compliance with this *Code* can assist in meeting goals outside of the *Code*'s scope.

A.4.1.1 Reasonable safety risk is further defined by subsequent language in this *Code*.

A.4.1.1(1) The phrase “intimate with the initial fire development” refers to the person(s) at the ignition source or first materials burning and not to all persons within the same room or area.

A.4.1.2 An assembly occupancy is an example of an occupancy where the goal of providing for reasonably safe emergency and nonemergency crowd movement has applicability. A detention or correctional occupancy is an example of an occupancy where emergency and nonemergency crowd move-

ment is better addressed by detention and correctional facilities specialists than by this *Code*.

A.4.3.1 Additional assumptions that need to be identified for a performance-based design are addressed in Chapter 5.

A.4.5.4 Fire alarms alert occupants to initiate emergency procedures, facilitate orderly conduct of fire drills, and initiate response by emergency services.

A.4.6.2 See A.4.6.3.

A.4.6.3 In existing buildings, it is not always practical to strictly apply the provisions of this *Code*. Physical limitations can cause the need for disproportionate effort or expense with little increase in life safety. In such cases, the authority having jurisdiction should be satisfied that reasonable life safety is ensured.

In existing buildings, it is intended that any condition that represents a serious threat to life be mitigated by the application of appropriate safeguards. It is not intended to require modifications for conditions that do not represent a significant threat to life, even though such conditions are not literally in compliance with the *Code*.

A.4.6.7 The following is an example of what is intended by 4.6.7. In a hospital that has 6-ft (1.8-m) wide corridors, such corridors cannot be reduced in width, even though the provisions for existing hospitals do not require 6-ft (1.8-m) wide corridors. However, if a hospital has 10-ft (3-m) wide corridors, they are permitted to be reduced to 8 ft (2.4 m) in width, which is the requirement for new construction. If the hospital corridor is 3 ft (0.9 m) wide, it would have to be increased to 4 ft (1.2 m). If alterations require replacement of a portion of a hospital corridor wall, such portion of the corridor would not be required to be increased to 8 ft (2.4 m) in width, unless it was practical to do so.

A.4.6.10.1 Fatal fires have occurred when, for example, a required stair has been closed for repairs or removed for rebuilding, or when a required automatic sprinkler system has been shut off to change piping.

A.4.6.10.2 See also NFPA 241, *Standard for Safeguarding Construction, Alteration, and Demolition Operations*.

A.4.6.11 Examples of changes from one occupancy subclassification to another subclassification of the same occupancy could include a change from a Class B to a Class A mercantile occupancy. Hospitals and nursing homes are both health care occupancies and are defined separately, but they are not established as separate suboccupancies; thus, a change from one to the other does not constitute a change of occupancy subclassification.

For example, a building was used as a hospital but has been closed for four years. It is again to be used as a hospital. As long as the building was not used as another occupancy during the time it was closed, it would be considered an existing hospital.

Hotels and apartments, although both residential occupancies, are treated separately, and a change from one to the other constitutes a change of occupancy.

A.4.6.12.2 Examples of such features include automatic sprinklers, fire alarm systems, standpipes, and portable fire extinguishers. The presence of a life safety feature, such as sprinklers or fire alarm devices, creates a reasonable expectation by the public that these safety features are functional. When systems are inoperable or taken out of service but the devices remain, they present a false sense of safety. Also,

before taking any life safety features out of service, extreme care needs to be exercised to ensure that the feature is not required, was not originally provided as an alternative or equivalency, or is no longer required due to other new requirements in the current *Code*. It is not intended that the entire system or protection feature be removed. Instead, components such as sprinklers, initiating devices, notification appliances, standpipe hose, and exit systems should be removed to reduce the likelihood of relying on inoperable systems or features.

A.4.7 The purpose of emergency egress and relocation drills is to educate the participants in the fire safety features of the building, the egress facilities available, and the procedures to be followed. Speed in emptying buildings or relocating occupants, while desirable, is not the only objective. Prior to an evaluation of the performance of an emergency egress and relocation drill, an opportunity for instruction and practice should be provided. This educational opportunity should be presented in a nonthreatening manner, with consideration to the prior knowledge, age, and ability of audience.

The usefulness of an emergency egress and relocation drill and the extent to which it can be performed depends on the character of the occupancy.

In buildings where the occupant load is of a changing character, such as hotels or department stores, no regularly organized emergency egress and relocation drill is possible. In such cases, the emergency egress and relocation drills are to be limited to the regular employees, who can, however, be thoroughly schooled in the proper procedure and can be trained to properly direct other occupants of the building in case of emergency evacuation or relocation. In occupancies such as hospitals, regular employees can be rehearsed in the proper procedure in case of fire; such training always is advisable in all occupancies whether or not regular emergency egress and relocation drills can be held.

A.4.7.2 If an emergency egress and relocation drill is considered merely as a routine exercise from which some persons are allowed to be excused, there is a grave danger that, in an actual emergency, the evacuation and relocation will not be successful. However, there might be circumstances under which all occupants do not participate in an emergency egress and relocation drill; for example, infirm or bedridden patients in a health care occupancy.

A.4.7.5 Fire is always unexpected. If the drill is always held in the same way at the same time, it loses much of its value. When, for some reason during an actual fire, it is not possible to follow the usual routine of the emergency egress and relocation drill to which occupants have become accustomed, confusion and panic might ensue. Drills should be carefully planned to simulate actual fire conditions. Not only should drills be held at varying times, but different means of exit or relocation areas should be used, based on an assumption that fire or smoke might prevent the use of normal egress and relocation avenues.

CHAPTER 5

A.5.1.1 Chapter 5 of this *Code* provides requirements for the evaluation of a performance-based life safety design. The evaluation process is summarized in Figure A.5.1.1.

Code Criteria. On the left hand side of Figure A.5.1.1 is input from the *Code*. The life safety goals have been stated in Section 4.1. The objectives necessary to achieve these goals are stated

in Section 4.2. Section 5.2 specifies the measures that are to be used to determine whether the objectives have been met.

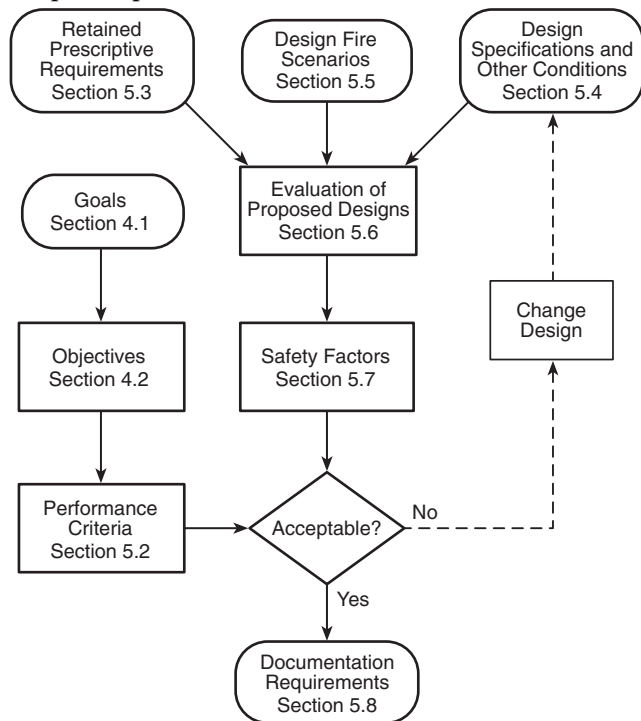
Input. At the top of Figure A.5.1.1 is the input necessary to evaluate a life safety design.

The design specifications are to include certain retained prescriptive requirements as specified in Section 5.3. All assumptions about the life safety design and the response of the building and its occupants to a fire are to be clearly stated as indicated in Section 5.4. Scenarios are used to assess the adequacy of the design. Eight sets of initiating events are specified for which the ensuing outcomes are to be satisfactory.

Performance Assessment. Appropriate methods for assessing performance are to be used per Section 5.6. Safety factors are to be applied to account for uncertainties in the assessment as stated in Section 5.7. If the resulting predicted outcome of the scenarios is bounded by the performance criteria, then the objectives have been met and the life safety design is considered to be in compliance with this *Code*. Although not part of this *Code*, a design that fails to comply can be changed and reassessed as indicated on the right hand side of Figure A.5.1.1.

Documentation. The approval and acceptance of a life safety design are dependent on the quality of the documentation of the process. Section 5.8 specifies a minimum set of documentation that is to accompany a submission.

FIGURE A.5.1.1 Performance-based Life Safety Code compliance process.



The performance option of this *Code* establishes acceptable levels of risk to occupants of buildings and structures as addressed in Section 1.2. While the performance option of this *Code* does contain goals, objectives and performance criteria necessary to provide an acceptable level of risk to occupants, it does not describe how to meet the goals, objectives, and performance criteria. Design and engineering are needed to develop solutions that meet the provisions of Chapter 5.

The *SFPE Engineering Guide to Performance-Based Fire Protection Analysis and Design of Buildings* provides a framework for these assessments. Other useful references include the *Australian Fire Engineering Guidelines* and the *British Standard Firesafety Engineering in Buildings*.

A.5.1.3 Qualifications should include experience, education, and credentials that demonstrate knowledgeable and responsible use of applicable models and methods.

A.5.1.4 A third-party reviewer is a person or group of persons chosen by the authority having jurisdiction to review proposed performance-based designs.

A.5.1.7 Continued compliance with the goals and objectives of the *Code* involves many factors. The building construction — including openings, interior finish, and fire- and smoke-resistant construction — and the building and fire protection systems need to retain at least the same level of performance as is provided for the original design parameters. The use and occupancy should not change to the degree that assumptions made about the occupant characteristics, combustibility of furnishings, and existence of trained personnel are no longer valid. In addition, actions provided by other personnel, such as emergency responders, should not be diminished below the documented assumed levels. Also, actions needed to maintain reliability of systems at the anticipated level need to meet the initial design criteria.

A.5.2.2 One of the following methods can be used to avoid exposing occupants to untenable conditions.

(a) The design team can set detailed performance criteria that ensures that occupants are not incapacitated by fire effects. The *SFPE Engineering Guide to Performance-Based Fire Protection Analysis and Design of Buildings* describes a process of establishing tenability limits.

The guide references D. A. Purser, “Toxicity Assessment of Combustion Products,” Chapters 2–8, *SFPE Handbook of Fire Protection Engineering*, National Fire Protection Association, Quincy, MA, 1995, which describes a fractional effective dose (FED) calculation approach also contained in the 1996 edition of NFPA 269, *Standard Test Method for Developing Toxic Potency Data for Use in Fire Hazard Modeling*. FED addresses carbon monoxide, hydrogen cyanide, carbon dioxide, hydrogen chloride, hydrogen bromide, and anoxia effects. It is possible to use the test data, combined with laboratory experience, to estimate the FED value that leads to the survival of virtually all people. This value is about 0.8.

There is a relationship between exposures leading to death and those leading to incapacitation. Kaplan (Kaplan et al., *Journal of Fire Science*, 2 286–305 (1984)) found that rodent susceptibility is similar to that of humans and that for the narcotic gases, CO and HCN, incapacitation occurs at one-third to one-half of the lethal exposure. Gann (Gann et al., *Fire and Materials*, 18 193 (1994)) found that carbon monoxide dominates the lethality of fire smoke, since most fire deaths occur remote from the fire room, in fires that have proceeded past flashover. Thus, if an FED value of 0.8 were used for a nonlethal exposure, an FED of 0.3 would be reasonable for a nonincapacitating exposure.

If the authority having jurisdiction or the design professional is concerned with potential toxic fire effects other than those addressed by the FED procedure as documented, then the calculation procedure can be expanded by adding additional terms to the FED equation, with each term expressed as

a ratio. The numerator of the ratio is the cumulative exposure to that fire effect, measured as an integral of the product of instantaneous exposure (concentration for toxic products) and time. The denominator of the ratio is the quantity of cumulative exposure for which FED equals the chosen threshold value (that is, 0.8 or 0.3) based on that fire effect alone.

ASTM is actively considering standards that would extend the list of toxic fire effects with standard values.

If the authority having jurisdiction or the design professional is concerned with potential fire effects other than toxicity, then the calculation procedure can be modified to include other fire effects, such as thermal effects.

For buildings where an unusually large fraction of the occupants are especially vulnerable, the calculation procedure should be modified to use FED values lower than 0.8 or 0.3.

(b) For each design fire scenario and the design specifications, conditions, and assumptions, the design team can demonstrate that each room or area will be fully evacuated before the smoke and toxic gas layer in that room descends to a level lower than 6 ft (1.8 m) above the floor. The timing of such an evacuation means that no occupant is exposed to fire effects. Such an evacuation requires calculation of the locations, movement, and behavior of occupants, because fire effects and occupants are kept separate by moving the occupants. A level of 5 ft (1.5 m) is often used in calculations, but at that level, a large fraction of the population would not be able to stand, walk, or run normally and still avoid inhalation of toxic gases. They would have to bend over or otherwise move their heads closer to the floor level.

(c) For each design fire scenario and the design specifications and assumptions, the design team can demonstrate that the smoke and toxic gas layer will not descend to a level lower than 6 ft (1.8 m) above the floor in any occupied room. The advantage of this procedure is that it conservatively requires that no occupant need be exposed to fire effects, regardless of where occupants are or where they move. This removes the need to make any calculations regarding occupants, including their behavior, movement locations, pre-fire characteristics, and reactions to fire effects. This procedure is even more conservative and simpler than the procedure in item (b), because it does not allow fire effects in occupied rooms to develop to a point where people could be affected at any time during the fire.

(d) For each design fire scenario and the design specifications and assumptions, the design team can demonstrate that no fire effects will reach any occupied room. The advantage of this procedure is that it removes the need to make any calculations regarding occupants, including their behavior, movement, locations, pre-fire characteristics, and reactions to fire effects. A further advantage is that it also removes the need for some of the modeling of fire effects, because it is not necessary to model the filling of rooms, only the spread of fire effects to those rooms. This procedure is even more conservative and simpler than the procedures in items (b) and (c), because it does not allow any fire effects in occupied rooms.

A.5.3.1 This requirement applies both to systems and features required by the *Code* that reference applicable standards and to any additional systems or features included in the design at the discretion of the design team. The referenced standards are hereby expected to state maintenance, testing, and other requirements needed to provide positive assurance of an acceptable level of reliability. The referenced standards themselves might be prescriptive- or performance-based.

A.5.4.1 The design specifications and other conditions will form the input to evaluation of proposed designs (*see Section 5.6*). Where a specification or condition is not known, a reasonable estimation is permitted. However, the design team will need to take steps to ensure that the estimation is valid during the life of the building. Any estimations need to be documented. (*See Section 5.8.*)

A.5.4.4 Systems addressed by this requirement include automatic fire suppression systems and fire alarm systems. Performance issues that need to be documented might include response time indexes, discharge densities and distribution patterns. Calculations should not include an unlimited supply of extinguishing agent if only a limited supply will be provided in the actual structure or building.

A.5.4.5.1 Examples of design features that might be incorporated to modify expected occupant characteristics include training, use of staff to assist with notification and movement, or type of notification appliance used.

A.5.4.5.2 The four basic characteristics — sensibility, reactivity, mobility, and susceptibility — comprise a minimum, exhaustive set of mutually exclusive performance characteristics of people in buildings that can affect a fire safety system's ability to meet life safety objectives. The characteristics are briefly described as follows.

(a) *Sensibility – to physical cues.* Ability to sense the sounding of an alarm; can also include discernment and discrimination of visual and olfactory cues in addition to auditory emanations from the fire itself.

(b) *Reactivity – ability to interpret correctly cues and take appropriate action.* Can be function of cognitive capacity, speed of instinctive reaction, or group dynamics; might need to consider reliability or likelihood of a wrong decision, as in situations where familiarity with the premises influences wayfinding.

(c) *Mobility – speed of movement.* Determined by individual capabilities as well as crowding phenomena such as arching at doorways.

(d) *Susceptibility – to products of combustion.* Metabolism, lung capacity, pulmonary disease, allergies, or other physical limitations that affect survivability in a fire environment.

In application, as with the use of computer evacuation models, assumptions can address a larger number of factors that are components of these basic performance characteristics. Examples follow.

Alertness	Awake/asleep, can depend on time of day
Responsiveness	Ability to sense cues and react
Commitment	Degree to which occupant is committed to an activity underway before the alarm
Focal point	Point at which an occupant's attention is focused, for example, to front of classroom, stage, or server in business environment
Physical and mental capabilities	Can affect ability to sense, respond, and react to cues; might be related to age or disability

Role	Can determine whether occupant will lead or follow others
Familiarity	Can depend on time spent in building or participation in emergency training
Social affiliation	Extent to which an occupant will act/react as an individual or as a member of a group
Condition	Over the course of the fire, the effects — both physiological and psychological — of the fire and its combustion products on each occupant

A.5.4.5.4 The number of people expected to be contained in a room or area should be based on the occupant load factor specified in Table 7.3.1.2 or other approved sources.

A.5.4.5.5 For example, in hospitals, staff characteristic such as number, location, quality, and frequency of training should be considered.

A.5.4.7 Design proposals need to state explicitly any design specifications or estimations regarding building fire safety plans, inspection programs, or other ongoing programs whose performance is necessary for the building, when occupied and operational, to meet the stated goals and objectives.

Programs of interest include any maintenance, training, labeling, or certification programs required to ensure operational status or reliability in building systems or features.

A.5.4.9 This includes assumptions about the interrelations between the performance of building elements and systems, occupant behavior, or emergency response actions that conflict with each other. For each fire scenario, care needs to be taken to ensure that conflicts in actions do not occur. Typical conflicts could include (1) assuming a fire door will remain closed during the fire to contain smoke, while this same door is used by occupants during egress from the area, (2) assuming fire apparatus will arrive immediately from a distant location to provide water to fire department connections and similar situations.

For example, an assumption that compartmentation blocking the passage of fire and smoke will be maintained at the door to a stairwell cannot be paired with an assumption that evacuation through that door will extend over many minutes.

A.5.4.10 This includes provisions that are in excess of basic requirements covered by referenced codes and standards, typical design requirements, and operating procedures. It includes provisions such as more frequent periodic testing and maintenance to increase the reliability of fire protection systems, redundant systems to increase reliability, on-site guard service to enhance detection of fires and aid in fire response procedures, staff training, availability and performance of emergency response personnel, and other factors.

A.5.5 Design fire scenarios define the challenge a building is expected to withstand. Design fire scenarios capture and limit value judgments on the type and severity of the fire challenge to which a proposed fire safety system needs to respond. The system includes any and all aspects of the proposed design that are intended to mitigate the effects of a fire, such as egress sys-

tem, automatic detection and suppression, barriers, staff training, and placement of manual extinguishers.

Design fire scenarios come from two sources: those that are specified in paragraphs 5.5.3.1 through 5.5.3.8, and those that are developed by the design team based on the unique characteristics of the building as required by 5.5.2. In most, if not all, cases, more than one design fire scenario will be developed to meet the requirements of 5.5.2.

Once the set of design fire scenarios is established, both those specified by 5.5.3.1 through 5.5.3.8 and those that are developed as required by 5.5.2, they need to be quantified into a format that can be used for the evaluation of proposed designs. The *SFPE Engineering Guide to Performance-Based Fire Protection Analysis and Design of Buildings* outlines a process and identifies tools and references that can be used at each step of this process.

A.5.5.2 The protection systems and features used to meet the challenge of the design fire scenario should be typical of, and consistent with, those used for other similar areas of the building. They should not be designed to be more effective in the building area addressed than in similar areas not included and that are, therefore, not explicitly evaluated.

A.5.5.3 It is desirable to consider a wide variety of different fire scenarios to evaluate the complete life safety capabilities of the building or structure. Fire scenarios should not be limited to a single or a couple of worst case fire scenarios.

The descriptive terms used to indicate the rate of fire growth for the scenarios are intended to be generic. Use of t-squared fires is not required for any scenario.

A.5.5.3.1 Scenario 1. An example of such a scenario for a health care occupancy would involve a patient room with two occupied beds with a fire initially involving one bed and the room door open. This is a cursory example in that much of the explicitly required information indicated in 5.5.3.1 can be determined from the information provided in the example. Note that it is usually necessary to consider more than one scenario to capture the features and conditions typical of an occupancy.

A.5.5.3.2 Scenario 2. Examples of such scenarios are a fire involving ignition of gasoline as an accelerant in a means of egress, clothing racks in corridors, renovation materials, or other fuel configurations that can cause an ultrafast fire. The means of egress chosen is the doorway with the largest egress capacity among doorways normally used in the ordinary operation of the building. The baseline occupant characteristics for the property are assumed. At ignition, doors are assumed to be open throughout the building.

A.5.5.3.3 Scenario 3. An example of such a scenario is a fire in a storage room adjacent to the largest occupiable room in the building. The contents of the room of fire origin are specified to provide the largest fuel load and the most rapid growth in fire severity consistent with the normal use of the room. The adjacent occupiable room is assumed to be filled to capacity with occupants. Occupants are assumed to be somewhat impaired in whatever form is most consistent with the intended use of the building. At ignition, doors from both rooms are assumed to be open. Depending on the design, doorways connect the two rooms or they connect via a common hallway or corridor.

For purposes of this scenario, an occupiable room is a room that might contain people, that is, a location within a building where people are typically found.

A.5.5.3.4 Scenario 4. An example of such a scenario is a fire originating in a concealed wall- or ceiling-space adjacent to a large, occupied function room. Ignition involves concealed combustibles, including wire or cable insulation and thermal or acoustical insulation. The adjacent function room is assumed to be occupied to capacity. The baseline occupant characteristics for the property are assumed. At ignition, doors are assumed to be open throughout the building.

A.5.5.3.5 Scenario 5. An example of such a scenario is a cigarette fire in a trash can. The trash can is close enough to room contents to ignite more substantial fuel sources but is not close enough to any occupant to create an intimate-with-ignition situation. If the intended use of the property involves the potential for some occupants to be incapable of movement at any time, then the room of origin is chosen as the type of room likely to have such occupants, filled to capacity with occupants in that condition. If the intended use of the property does not involve the potential for some occupants to be incapable of movement, then the room of origin is chosen to be an assembly or function area characteristic of the use of the property, and the trash can is placed so that it is shielded by furniture from suppression systems. At ignition, doors are assumed to be open throughout the building.

A.5.5.3.6 Scenario 6. An example of such a scenario is a fire originating in the largest fuel load of combustibles possible in normal operation in a function or assembly room, or in a process/manufacturing area, characteristic of the normal operation of the property. The configuration, type, and geometry of the combustibles are chosen so as to produce the most rapid and severe fire growth or smoke generation consistent with the normal operation of the property. The baseline occupant characteristics for the property are assumed. At ignition, doors are assumed to be closed throughout the building.

This scenario includes everything from a big couch fire in a small dwelling to a rack fire in combustible liquids stock in a big box retail store.

A.5.5.3.7 Scenario 7. An example of such a scenario is an exposure fire. The initiating fire is the closest and most severe fire possible consistent with the placement and type of adjacent properties and the placement of plants and combustible adornments on the property. The baseline occupant characteristics for the property are assumed.

This category includes wildlands/urban interface fires and exterior wood shingle problems, where applicable.

A.5.5.3.8 Scenario 8. This scenario addresses a set of conditions with a typical fire originating in the building with any one passive or active fire protection system or feature being ineffective. Examples include unprotected openings between floors or between fire walls or fire barrier walls, rated fire doors fail to close automatically or are blocked open, sprinkler system water supply shut off, fire alarm system nonoperative, smoke management system not operational, or automatic smoke dampers blocked open. This scenario should represent a reasonable challenge to the other building features provided by the design and presumed to be available.

The concept of a fire originating in ordinary combustibles is intentionally selected for this scenario. This fire, although presenting a realistic challenge to the building and the associated building systems, does not represent the worst case scenario or the most challenging fire for the building. Examples include the following:

(a) A fire originating in ordinary combustibles in the corridor of a patient wing of a hospital. Staff is assumed not to close any patient room doors upon detection of fire. The baseline occupant characteristics for the property are assumed, and the patient rooms off the corridor are assumed to be filled to capacity. At ignition, doors to patient rooms are not equipped with self-closing devices and are assumed to be open throughout the smoke compartment.

(b) A fire originating in ordinary combustibles in a large assembly room or area in the interior of the building. The automatic suppression systems are assumed to be out of operation. The baseline occupant characteristics for the property are assumed, and the room of origin is assumed to be filled to capacity. At ignition, doors are assumed to be closed throughout the building.

(c) A fire originating in ordinary combustibles in an unoccupied small function room adjacent to a large assembly room or area in the interior of the building. The automatic detection systems are assumed to be out of operation. The baseline occupant characteristics for the property are assumed, the room of origin is assumed to be unoccupied, and the assembly room is assumed to be filled to capacity. At ignition, doors are assumed to be closed throughout the building.

A.5.5.3.8 Exception The exception is applied to each active or passive fire protection system individually and requires two different types of information to be developed by analysis and approved by the authority having jurisdiction. System reliability is to be analyzed and accepted. Design performance in the absence of the system is also to be analyzed and accepted, but acceptable performance does not require fully meeting the stated goals and objectives. It might not be possible to meet fully the goals and objectives if a key system is unavailable, and yet no system is totally reliable. The authority having jurisdiction will determine which level of performance, possibly short of the stated goals and objectives, is acceptable, given the very low probability (that is, the system's unreliability probability) that the system will not be available.

A.5.6 The *SFPE Engineering Guide to Performance-Based Fire Protection Analysis and Design of Buildings* outlines a process for evaluating whether trial designs meet the performance criteria during the design fire scenarios.

The procedures described in Sections 5.2 and 5.4 identify required design fire scenarios among the design fire scenarios within which a proposed fire safety design is required to perform and the associated untenable conditions that are to be avoided in order to maintain life safety. Section 5.6 discusses methods that form the link from the scenarios and criteria to the goals and objectives.

Assessment methods are used to demonstrate that the proposed design will achieve the stated goals/objectives, by providing information indicating that the performance criteria of Section 5.2 can be adequately met. Assessment methods are permitted to be either tests or modeling.

Tests. Test results can be directly used to assess a fire safety design when they accurately represent the scenarios developed by using Section 5.4 and provide output data matching the performance criteria in Section 5.2. Since the performance criteria for this *Code* are stated in terms of human exposure to lethal fire effects, no test will suffice. However, tests will be needed to produce data for use in models and other calculation methods.

Standardized Tests. Standardized tests are conducted on various systems and components to determine whether they meet

some predetermined, typically prescriptive criteria. Results are given on a pass/fail basis: the test specimen either does or does not meet the pre-established criteria. The actual performance of the test specimen is not usually recorded.

Scale. Tests can be either small, intermediate, or full scale. Small-scale tests are used to test activation of detection and suppression devices and the flammability and toxicity of materials. Usually, the item to be tested is placed within the testing device or apparatus. Intermediate-scale tests can be used to determine the adequacy of system components, for example, doors and windows, as opposed to entire systems. The difference between small- and intermediate-scale tests is usually one of definition provided by those conducting the test. Full-scale tests are typically used to test building and structural components or entire systems. The difference between intermediate- and large-scale tests is also subject to the definition of those performing the test. Full-scale tests are intended to most closely depict performance of the test subject as installed in the field, that is, most closely represent real world performance.

Full-scale building evacuations can provide information on how the evacuation of a structure is likely to occur for an existing building with a given population without subjecting occupants to the real physical or psychological effects of a fire.

Data Uses. The data obtained from standardized tests have three uses for verification purposes. The test results can be used instead of a model. This use is typically the role of full-scale test results. The test results can be used as a basis for validating the model. The model predictions match well with the test results. Therefore, the model can be used in situations similar to the test scenario. The test results can be used as input to models. This is typically the use of small-scale tests, specifically flammability tests.

Start-Up Test. Start-up test results can be used to demonstrate that the fire safety system performs as designed. The system design might be based on modeling. If the start-up test indicates a deficiency, then the system needs to be adjusted and retested until it can be demonstrated that the design can meet the performance criteria. Typically, start-up tests apply only to the installation to which they are designed.

Experimental Data. Experimental data from nonstandardized tests can be used when the specified scenario and the experimental setup are similar. Typically, experimental data are applicable to a greater variety of scenarios than are standardized test results.

Human and Organizational Performance Tests. Certain tests determine whether inputs used to determine human performance criteria remain valid during the occupancy of a building. Tests of human and organizational performance might include any of the following:

- (1) Evacuation times measured during fire drills
- (2) Querying emergency response team members to determine whether they know required procedures
- (3) Field tests to ensure that emergency response team members can execute tasks within predetermined times and accuracy limits.

Design proposals should include descriptions of any tests that are needed to determine whether stated goals, objectives and performance criteria are being met.

Modeling. Models can be used to predict the performance criteria for a given scenario. Because of the limitations on use of tests alone for this purpose, models are expected to be used in most, if not all, performance-based design assessments.

Fire models do not model fires, they model the effects of a (user) specified fire, that is, a heat release rate curve is input.

For ease, the term *fire model* will be used instead of the more accurate *fire effects model*.

The effect of fire and its toxic products on the occupants can be modeled, as can the movement and behavior of occupants during the fire. The term *evacuation model* will be used to describe models that predict the location and movements of occupants, and the term *tenability model* will be used to describe models that predict the effects on occupants of specified levels of exposure to fire effects.

Types of Fire Models. Fire models will be used to predict fire-related performance criteria. Fire models can be either probabilistic or deterministic. Several types of deterministic models are available: computational fluid dynamics (CFD or field) models, zone models, purpose-built models, and hand calculations. Probabilistic fire models are also available, but are less likely to be used for this purpose.

Probabilistic fire models use the probabilities as well as the severity of various events as the basis of evaluation. Some probabilistic models incorporate deterministic models, but this is not a requirement. Probabilistic models attempt to predict the likelihood or probability that events or severity associated with an unwanted fire will occur or the “expected” loss, which can be thought of as the probability-weighted average severity across all possible scenarios. Probabilistic models can be manifested as fault or event trees or other system models that use frequency or probability data as input. These models tend to be manifested as computer software, but this is not a requirement. Furthermore, the discussion that follows under “Sources of Models” can also be applied to probabilistic models, although it concentrates on deterministic models.

CFD models provide the most accurate predictions of all the deterministic models, because they divide a given space into thousands of smaller volumes. However, since they are still models, they are not absolute in their depiction of reality. In addition, they are much more expensive to use because they are computationally intensive. Because of their expense, complexity, and intensive computational needs, CFD models require much greater scrutiny than do zone models. It is much more difficult to provide multiple runs of CFD models to check sensitivity to a variety of factors such as design fire cell resolution and ventilation.

Zone models are more widely used than CFD models because they provide reasonably accurate predictions in much less time. It is much easier to assess the sensitivity of different parameters with zone models because they generally run much faster and the output is much easier to interpret. Prediction of fire growth and spread has a large number of variables associated with it. Consequently, the zone models with their crudeness and speed have advantages over the more complex CFD models.

Purpose-built models (also known as stand-alone models) are similar to zone models in their ease of use. However, purpose-built models do not provide a comprehensive model. Instead, they predict the value of one variable of interest. For example, such a model can predict the conditions of a ceiling jet at a specified location under a ceiling, but a zone model would “transport” those conditions throughout the enclosure.

Purpose-built models might or might not be manifested as computer software. Models that are not referred to as hand calculations. These purpose-built models are, therefore, simple enough that the data management capabilities of a computer are not necessary. Many of these calculations are found in the *SFPE Handbook of Fire Protection Engineering*.

Types of Evacuation Models. There are three categories of evacuation models that can be considered: single-parameter estimation methods, movement models, and behavioral simulation models.

Single-parameter estimations are generally used for simple estimates of movement time. They are usually based on equations derived from observations of movement in nonemergency situations. They can be hand calculations or simple computer models. Examples include calculation methods for flow times based on widths of exit paths and travel times based on travel distances. Sources for these methods include the *SFPE Handbook of Fire Protection Engineering* and the *NFPA Fire Protection Handbook*.

Movement models generally handle large numbers of people in a network flow similar to water in pipes or ball bearings in chutes. They tend to optimize occupant behavior, resulting in predicted evacuation times that can be unrealistic and far from conservative. However, they can be useful in an overall assessment of a design, especially in early evaluation stages where an unacceptable result with this sort of model indicates that the design has failed to achieve the life safety objectives.

Behavioral simulation models take into consideration more of the variables related to occupant movement and behavior. Occupants are treated as individuals and can have characteristics assigned to them uniquely, allowing a more realistic simulation of the design under consideration. However, given the limited availability of data for the development of these models, for their verification by their authors, or for input when using them, their predictive reliability is questionable.

Tenability Models. In general, tenability models will be needed only to automate calculations for the time-of-exposure effect equations referenced in A.5.2.2.

Other Models. Models can be used to describe combustion (as noted, most fire models only characterize fire effects), automatic system performance, and other elements of the calculation. There are few models in common use for these purposes, so they are not described further here.

Sources of Models. Compendia of computer fire models are found in Friedman's *Survey of Computer Models for Fire and Smoke* and the *SFPE Computer Software Directory*. Within these references are models that were developed by the Building Fire Research Laboratory of National Institute of Standards and Technology, which can be downloaded from the Internet at <http://www.bfrl.nist.gov/864/fmabs.html>. Evacuation models in all three categories are discussed in the *SFPE Handbook of Fire Protection Engineering* and the *NFPA Fire Protection Handbook*.

Validation. Models undergo limited validation. Most can be considered demonstrated only for the experimental results they were based on or the limited set of scenarios to which the model developers compared the model's output, or a combination of both.

The Society of Fire Protection Engineers has a task group that independently evaluates computer models. As of January 1998, they are preparing to finish their first evaluation and have chosen a second model to evaluate. Until more models can be independently evaluated, the model user has to rely on the available documentation and previous experience for guidance regarding the appropriate use of a given model.

The design professional should present and the authority having jurisdiction, when deciding whether to approve a proposal, should consider the strength of the evidence presented for the validity, accuracy, relevance, and precision of the proposed methods. An element in establishing the strength of sci-

entific evidence is the extent of external review and acceptance of the evidence by peers of the authors of that evidence.

Models have limitations. Most are not user-friendly. For that reason, experienced users will be able to construct more reasonable models and better interpret output than novices. It is for these reasons that the third-party review and equivalency sections are provided. This is not meant to discourage the use of models, only to indicate that they should be used with caution by those well-versed in their nuances.

Input Data. The first step in using a model is to develop the input data. The heat release rate curve specified by the user is the driving force of a fire effects model. If this curve is incorrectly defined, the subsequent results are not usable. In addition to the smoldering and growth phases that will be specified as part of the scenario definition, two additional phases are needed to complete the input heat release rate curve — steady burning and burnout.

Steady burning is characterized by its duration, which is a function of the total amount of fuel available to be burned. In determining the duration of this phase, the designer needs to consider how much fuel has been assumed to be consumed in the smoldering and growth phases and how much is assumed to be consumed in the burnout phase that follows. A common assumption is that the burnout phase is the mirror image of the preceding phases, with a reversed heat release rate curve and the same amount of fuel consumed in the burnout phase as in the growth phase. Depending on the assumptions made regarding the amount of fuel consumed during burnout, the time at which this phase starts is likely to be easy to determine.

The above discussion assumes that the burning objects are solid (for example, tables and chairs). If liquid or gaseous fuels are involved, then the shape of the curve will be different. For example, smoldering is not relevant for burning liquids or gases, and the growth period is very short, typically measured in seconds. Peak heat release rate can depend primarily on the rate of release, on the leak rate (gases and liquid sprays), or on the extent of spill (pooled liquids). The steady burning phase is once again dependent upon the amount of fuel available to burn. Like the growth phase, the burnout phase is typically short (for example, closing a valve), although it is conceivable that longer times might be appropriate, depending on the extinguishment scenario.

Material properties are usually needed for all fuel items, both initial and secondary, and the enclosure surfaces of involved rooms or spaces.

For all fires of consequence, it is reasonable to assume that the fire receives adequate ventilation. If there is insufficient oxygen, the fire will not be sustained. An overabundance of oxygen is only a concern in special cases (for example, hermetically sealed spaces) when a fire might not occur due to dilution of the fuel (that is, a flammable mixture is not produced). Therefore, given that the scenarios of interest will occur in nonhermetically sealed enclosures, it is reasonable to assume that adequate ventilation is available and that, if a fire starts, it will continue to burn until it either runs out of fuel or is extinguished by other means. The only variable that might need to be assumed is the total vent width.

Maximum fire extent is affected by two geometric aspects: burning object proximity to walls and overall enclosure dimensions.

Conservatively, when a fire is "against a wall" or "in a corner," the effective heat release of the fire can be doubled and quadrupled, respectively. In order for the burning object to be considered against the wall or in the corner, it needs to be either

touching the enclosure surface or within 2 in. (about 5 cm) of the surface. The reasoning behind this convention is that a wall effectively cuts the fire plume in half, while a corner results in one quarter of the plume if the burning object is closer to the center of the room. Conceptually, the same amount of combustible vapors are produced, regardless of the burning object's position, but the presence of walls/corners results in a smaller volume in which to burn them. In other words, walls and corners effectively concentrate the flammable vapors resulting from pyrolysis of the fuel.

The room dimensions affect the time required for a room to flashover. For a given amount and type of fuel, under the same ventilation conditions, a small room will flashover before a large room. In a large room with a small amount of fuel, a fire will behave as if it is burning outside, that is, adequate oxygen for burning and no concentration of heat exist. If the fuel package is unchanged but the dimensions of the room are decreased, then the room will begin to have an effect on the fire, assuming adequate ventilation. The presence of the relatively smaller enclosure results in the buildup of a hot layer of smoke and other products of combustion under the ceiling. This buildup, in turn, feeds more heat back to the seat of the fire, which results in an increase in the pyrolysis rate of the fuel and thus increases the amount of heat energy released by the fire. The room enclosure surfaces themselves also contribute to this radiation feedback effect.

Probabilistic data is expressed as either a frequency (units of inverse time) or a probability (unitless but applicable to a stated period of time). An example of the former is the expected number of failures per year and the range of the latter is between zero and one, inclusive. Probabilities can be either objective or subjective. Subjective probabilities express a degree of belief that an event will occur. Objective probabilities are based on historical data and can be expressed as a reliability of an item such as a component or a system.

A.5.6.3.3 Procedures used to develop required input data need to preserve the intended conservatism of all scenarios and assumptions. Conservatism is only one means to address the uncertainty inherent in calculations and does not remove the need to consider safety factors, sensitivity analysis, and other methods of dealing with uncertainty. The *SFPE Engineering Guide to Performance-Based Fire Protection Analysis and Design of Buildings* outlines a process for identifying and treating uncertainty.

A.5.6.4 An assessment method translates input data, which might include test specifications, parameters or variables for modeling, or other data, into output data, which are measured against the performance criteria. Computer fire models should be evaluated for their predictive capability in accordance with ASTM E 1355, *Standard Guide for Evaluating the Predictive Capability of Fire Models*.

A.5.7.1 The assessment of precision required in 5.8.2 will require a sensitivity and uncertainty analysis, which can be translated into safety factors.

Sensitivity Analysis. The first run a model user makes should be labeled as the base case, using the nominal values of the various input parameters. However, the model user should not rely on a single run as the basis for any performance-based fire safety system design. Ideally, each variable or parameter that the model user made to develop the nominal input data should have multiple runs associated with it, as should combinations of key variables and parameters. Thus, a sensitivity

analysis should be conducted that provides the model user with data that indicates how the effects of a real fire might vary and how the response of the proposed fire safety design might also vary.

The interpretation of a model's predictions can be a difficult exercise if the model user does not have knowledge of fire dynamics or human behavior.

Reasonableness Check. The model user should first try to determine whether the predictions actually make sense, that is, they don't upset intuition or preconceived expectations. Most likely, if the results don't pass this test, an input error has been committed.

Sometimes the predictions appear to be reasonable but are, in fact, incorrect. For example, a model can predict higher temperatures farther from the fire than close to it. The values themselves might be reasonable, for example, they are not hotter than the fire, but they don't "flow" down the energy as expected.

A margin of safety can be developed using the results of the sensitivity analysis in conjunction with the performance criteria to provide the possible range of time during which a condition is estimated to occur.

Safety factors and margin of safety are two concepts used to quantify the amount of uncertainty in engineering analyses. Safety factors are used to provide a margin of safety and represent, or address, the gap in knowledge between the theoretically perfect model, that is, reality and the engineering models that can only partially represent reality.

Safety factors can be applied to either the predicted level of a physical condition or to the time at which the condition is predicted to occur. Thus, a physical or a temporal safety factor, or both, can be applied to any predicted condition. A predicted condition (that is, a parameter's value) and the time at which it occurs are best represented as distributions. Ideally, a computer fire model predicts the expected or nominal value of the distribution. Safety factors are intended to represent the spread of these distributions.

Given the uncertainty associated with data acquisition and reduction, and the limitations of computer modeling, any condition predicted by a computer model can be thought of as an expected or nominal value within a broader range. For example, an upper layer temperature of 600°C is predicted at a given time. If the modeled scenario is then tested (that is, full-scale experiment based on the computer model's input data), the actual temperature at that given time could be 640°C or 585°C. Therefore, the temperature should be reported as 600°C +40°C, -15°C or a range of 585°C to 640°C.

Ideally, predictions are reported as a nominal value, a percentage, or an absolute value. As an example, an upper layer temperature prediction could be reported as "600°C, 30°C" or "600°C, 5 percent." In this case, the physical safety factor is 0.05 (that is, the amount by which the nominal value should be degraded and enhanced). Given the state-of-the-art of computer fire modeling, this is a very low safety factor. Physical safety factors tend to be on the order of tens of percent. A safety factor of 50 percent is not unheard of.

Part of the problem in establishing safety factors is that it is difficult to state the percentage or range that is appropriate. These values can be obtained when the computer model predictions are compared to test data. However, using computer fire models in a design mode does not facilitate this since (1) the room being analyzed has not been built yet and (2) test scenarios do not necessarily depict the intended design.

A sensitivity analysis should be performed based on the assumptions that affect the condition of interest. A base case that uses all nominal values for input parameters should be developed. The input parameters should be varied over reasonable ranges and the variation in predicted output should be noted. This output variation can then become the basis for physical safety factors.

The temporal safety factor addresses the issue of when a condition is predicted and is a function of the rate at which processes are expected to occur. If a condition is predicted to occur 2 minutes after the start of the fire, then this can be used as a nominal value. A process similar to that described above for physical safety factors can also be employed to develop temporal safety factors. In this case, however, the rates (for example, of heat release and toxic product generation) will be varied instead of absolute values (for example, material properties).

The margin of safety can be thought of as a reflection of societal values and can be imposed by the authority having jurisdiction for that purpose. Since the time for which a condition is predicted will most likely be the focus of the authority having jurisdiction (for example, the model predicts occupants will have 5 minutes to safely evacuate), the margin of safety will be characterized by temporal aspects and tacitly applied to the physical margin of safety.

Escaping the harmful effects of fire (or mitigating them) is, effectively, a race against time. When assessing fire safety system designs based on computer model predictions, the choice of an acceptable time is important. When an authority having jurisdiction is faced with the predicted time of untenability, a decision needs to be made regarding whether sufficient time is available to ensure the safety of building occupants. The authority having jurisdiction is assessing the margin of safety. Is there sufficient time to get everyone out safely? If the authority having jurisdiction feels that the predicted egress time is too close to the time of untenability, then the authority having jurisdiction can impose an additional time that the designer will have to incorporate into the system design. In other words, the authority having jurisdiction can impose a greater margin of safety than that originally proposed by the designer.

A.5.8.1 The *SFPE Engineering Guide to Performance-Based Fire Protection Analysis and Design of Buildings* describes the documentation that should be provided for a performance-based design.

Proper documentation of a performance design is critical to the design acceptance and construction. Proper documentation will also ensure that all parties involved understand what is necessary for the design implementation, maintenance, and continuity of the fire protection design. If attention to details is maintained in the documentation, then there should be little dispute during approval, construction, start-up, and use.

Poor documentation could result in rejection of an otherwise good design, poor implementation of the design, inadequate system maintenance and reliability, and an incomplete record for future changes or for testing the design forensically.

A.5.8.2 The sources, methodologies, and data used in performance-based designs should be based on technical references that are widely accepted and used by the appropriate professions and professional groups. This acceptance is often based on documents that are developed, reviewed, and validated under one of the following processes:

- (1) Standards developed under an open consensus process conducted by recognized professional societies, codes or standards organizations, or governmental bodies
- (2) Technical references that are subject to a peer review process and published in widely recognized peer-reviewed journals, conference reports, or other publications
- (3) Resource publications such as the *SFPE Handbook of Fire Protection Engineering*, which are widely recognized technical sources of information

The following factors are helpful in determining the acceptability of the individual method or source:

- (a) Extent of general acceptance in the relevant professional community. Indications of this acceptance include peer-reviewed publication, widespread citation in the technical literature, and adoption by or within a consensus document.
- (b) Extent of documentation of the method, including the analytical method itself, assumptions, scope, limitations, data sources, and data reduction methods.
- (c) Extent of validation and analysis of uncertainties. This includes comparison of the overall method with experimental data to estimate error rates as well as analysis of the uncertainties of input data, uncertainties and limitations in the analytical method, and uncertainties in the associated performance criteria.
- (d) Extent to which the method is based on sound scientific principles.
- (e) Extent to which the proposed application is within the stated scope and limitations of the supporting information, including the range of applicability for which there is documented validation. Factors such as spatial dimensions, occupant characteristics, and ambient conditions, can limit valid applications.

In many cases, a method will be built from, and will include, numerous component analyses. These component analyses should be evaluated using the same factors that are applied to the overall method as outlined in items (a) through (e).

A method to address a specific fire safety issue, within documented limitations or validation regimes, might not exist. In such a case, sources and calculation methods can be used outside of their limitations, provided that the design team recognizes the limitations and addresses the resulting implications.

The technical references and methodologies to be used in a performance-based design should be closely evaluated by the design team and the authority having jurisdiction, and possibly by a third-party reviewer. The strength of the technical justification should be judged using criteria in items (a) through (e). This justification can be strengthened by the presence of data obtained from fire testing.

A.5.8.11 Documentation for modeling should conform to ASTM 1472, *Standard Guide for Documenting Computer Software*, although most, if not all, models were originally developed before this standard was promulgated.

CHAPTER 6

A.6.1.2.1 Assembly Occupancy. Assembly occupancies might include the following:

- (1) Armories
- (2) Assembly halls
- (3) Auditoriums
- (4) Bowling lanes
- (5) Club rooms
- (6) College and university classrooms, 50 persons and over
- (7) Conference rooms

- (8) Courtrooms
- (9) Dance halls
- (10) Drinking establishments
- (11) Exhibition halls
- (12) Gymnasiums
- (13) Libraries
- (14) Mortuary chapels
- (15) Motion picture theaters
- (16) Museums
- (17) Passenger stations and terminals of air, surface, underground, and marine public transportation facilities
- (18) Places of religious worship
- (19) Pool rooms
- (20) Recreation piers
- (21) Restaurants
- (22) Skating rinks
- (23) Special amusement buildings regardless of occupant load
- (24) Theaters

Assembly occupancies are characterized by the presence or potential presence of crowds with attendant panic hazard in case of fire or other emergency. They are generally or occasionally open to the public, and the occupants, who are present voluntarily, are not ordinarily subject to discipline or control. Such buildings are ordinarily occupied by able-bodied persons and are not used for sleeping purposes. Special conference rooms, snack areas, and other areas incidental to, and under the control of, the management of other occupancies, such as offices, fall under the 50-person limitation.

Restaurants and drinking establishments with an occupant load of fewer than 50 persons should be classified as mercantile occupancies.

For special amusement buildings, see 12.4.7 and 13.4.7.

A.6.1.3.1 Educational Occupancy. Educational occupancies include the following:

- (1) Academies
- (2) Kindergartens
- (3) Schools

An educational occupancy is distinguished from an assembly occupancy in that the same occupants are regularly present.

A.6.1.4.1 Day-Care Occupancy. Day-care occupancies include the following:

- (1) Adult day-care occupancies, except where part of a health care occupancy
- (2) Child day-care occupancies
- (3) Day-care homes
- (4) Kindergarten classes that are incidental to a child day-care occupancy
- (5) Nursery schools

In areas where public schools offer only half-day kindergarten programs, many child day-care occupancies offer state-approved kindergarten classes for children who need full-day care. As these classes are normally incidental to the day-care occupancy, the requirements of the day-care occupancy should be followed.

A.6.1.5.1 Health Care Occupancy. Health care occupancies include the following:

- (1) Hospitals
- (2) Limited care facilities
- (3) Nursing homes

Occupants of health care occupancies typically have physical or mental illness, disease, or infirmity. They also include infants, convalescents, or infirm aged persons.

A.6.1.7.1 Detention and Correctional Occupancy. Detention and correctional occupancies include the following:

- (1) Adult and juvenile substance abuse centers
- (2) Adult and juvenile work camps
- (3) Adult community residential centers
- (4) Adult correctional institutions
- (5) Adult local detention facilities
- (6) Juvenile community residential centers
- (7) Juvenile detention facilities
- (8) Juvenile training schools

A.6.1.7.2 Chapters 22 and 23 address the residential housing areas of the detention and correctional occupancy as defined in 3.3.45. Examples of uses other than residential housing include gymnasiums or industries.

A.6.1.8.1 Residential Occupancy. Residential occupancies are treated as separate occupancies in this *Code* as follows:

- (1) One- and two-family dwellings (Chapter 24)
- (2) Lodging or rooming houses (Chapter 26)
- (3) Hotels, motels, and dormitories (Chapters 28 and 29)
- (4) Apartment buildings (Chapters 30 and 31)

A.6.1.9.1 Residential Board and Care Occupancy. The following are examples of facilities that are classified as residential board and care occupancies:

- (1) A group housing arrangement for physically or mentally handicapped persons who normally attend school in the community, attend worship in the community, or otherwise use community facilities
- (2) A group housing arrangement for physically or mentally handicapped persons who are undergoing training in preparation for independent living, for paid employment, or for other normal community activities
- (3) A group housing arrangement for the elderly that provides personal care services but that does not provide nursing care
- (4) Facilities for social rehabilitation, alcoholism, drug abuse, or mental health problems that contain a group housing arrangement and that provide personal care services but do not provide acute care
- (5) Assisted living facilities
- (6) Other group housing arrangements that provide personal care services but not nursing care

A.6.1.10.1 Mercantile Occupancy. Mercantile occupancies include the following:

- (1) Auction rooms
- (2) Department stores
- (3) Drugstores
- (4) Restaurants with fewer than 50 persons
- (5) Shopping centers
- (6) Supermarkets

Office, storage, and service facilities incidental to the sale of merchandise and located in the same building should be considered part of the mercantile occupancy classification.

A.6.1.11.1 Business Occupancy. Business occupancies include the following:

- (1) Air traffic control towers (ATCTs)
- (2) City halls

- (3) College and university instructional buildings, classrooms under 50 persons, and instructional laboratories
- (4) Courthouses
- (5) Dentists' offices
- (6) Doctors' offices
- (7) General offices
- (8) Outpatient clinics, ambulatory
- (9) Town halls

Doctors' and dentists' offices are included, unless of such character as to be classified as ambulatory health care occupancies as defined in 3.3.8.

Birth centers occupied by fewer than four patients, not including infants, at any one time; not providing sleeping facilities for four or more occupants; and not providing treatment procedures that render four or more patients, not including infants, incapable of self-preservation at any one time should be classified as business occupancies. For birth centers occupied by patients not meeting these parameters, see Chapter 18 or Chapter 19, as appropriate.

Service facilities common to city office buildings such as newsstands, lunch counters serving fewer than 50 persons, barber shops, and beauty parlors are included in the business occupancy group.

City halls, town halls, and court houses are included in this occupancy group insofar as their principal function is the transaction of public business and the keeping of books and records. Insofar as they are used for assembly purposes, they are classified as assembly occupancies.

A.6.1.12.1 Industrial Occupancy. Industrial occupancies include the following:

- (1) Dry cleaning plants
- (2) Factories of all kinds
- (3) Food processing plants
- (4) Gas plants
- (5) Hangars (for servicing/maintenance)
- (6) Laundries
- (7) Power plants
- (8) Pumping stations
- (9) Refineries
- (10) Sawmills
- (11) Telephone exchanges

In evaluating the appropriate classification of laboratories, the authority having jurisdiction should treat each case individually based on the extent and nature of the associated hazards. Some laboratories are classified as occupancies other than industrial; for example, a physical therapy laboratory or a computer laboratory.

A.6.1.13.1 Storage Occupancy. Storage occupancies include the following:

- (1) Barns
- (2) Bulk oil storage
- (3) Cold storage
- (4) Freight terminals
- (5) Grain elevators
- (6) Hangars (for storage only)
- (7) Parking structures
- (8) Stables
- (9) Truck and marine terminals
- (10) Warehouses

Storage occupancies are characterized by the presence of relatively small numbers of persons in proportion to the area.

A.6.1.14.1 Mixed Occupancy. With only a few exceptions, the *Code* sets no specific occupancy separation requirements. The authority having jurisdiction determines the separation needed, if any, based on 6.1.14 and subsection __.1.2 of each occupancy chapter. The local building code or the model building codes might be consulted by the authority having jurisdiction in making this determination, keeping life safety rather than property protection in mind.

A.6.1.14.2 Exception. Examples of uses that might be incidental to another occupancy include the following:

- (1) A newsstand (mercantile) in an office building
- (2) A giftshop (mercantile) in a hotel
- (3) A small storage area (storage) in any occupancy
- (4) Minor office space (business) in any occupancy
- (5) A maintenance area (industrial) in any occupancy

Examples of uses that have occupant loads below the occupancy classification threshold levels include the following:

- (1) An assembly use with fewer than 50 persons within a business occupancy
- (2) An educational use with fewer than 6 persons within an apartment building

A.6.2.1.3 Under this provision, any violation of the requirements of Chapter 11 through Chapter 42 for separation or protection of hazardous operation or storage would inherently involve violation of the other sections of the *Code*, unless additional egress facilities appropriate to high hazard contents were provided.

A.6.2.2.1 These classifications do not apply to the application of sprinkler protection classifications. (*See NFPA 13, Standard for the Installation of Sprinkler Systems.*)

A.6.2.2.2 Chapter 42 recognizes storage of noncombustible materials as low hazard. In other occupancies it is assumed that, even where the actual contents hazard is normally low, there is sufficient likelihood that some combustible materials or hazardous operations will be introduced in connection with building repair or maintenance, or some psychological factor might create conditions conducive to panic, so that the egress facilities cannot safely be reduced below those specified for ordinary hazard contents.

A.6.2.2.3 Ordinary hazard classification represents the conditions found in most buildings and is the basis for the general requirements of this *Code*.

The fear of poisonous fumes or explosions is necessarily a relative matter to be determined on a judgment basis. All smoke contains some toxic fire gases but, under conditions of ordinary hazard, there should be no unduly dangerous exposure during the period necessary to escape from the fire area, assuming there are proper exits.

A.6.2.2.4 High hazard contents include occupancies where flammable liquids are handled or used or are stored under conditions involving possible release of flammable vapors; where grain dust, wood flour or plastic dust, aluminum or magnesium dust, or other explosive dusts are produced; where hazardous chemicals or explosives are manufactured, stored, or handled; where cotton or other combustible fibers are processed or handled under conditions producing flammable flyings; and other situations of similar hazard.

Chapter 40 and Chapter 42 include detailed provisions on high hazard contents.

CHAPTER 7

A.7.1.1 Portable ladders, rope fire escapes, and similar emergency escape devices can have a useful function in facilitating escape from burning buildings lacking adequate exits of the stair or other standard type, but they are not the equivalent of standard exits, and their use is not in any way recognized by this *Code* as satisfying the requirements for means of egress. Furthermore, many such devices are of types unsuitable for use by aged or infirm persons or by small children. Therefore, such devices can provide a false sense of security and should not be used as an excuse for not providing standard exit facilities.

A.7.1.3.2.1(a) and (b) In existing buildings, existing walls in good repair consisting of lath and plaster, gypsum wallboard, or masonry units can usually provide satisfactory protection for the purposes of this requirement where a 1-hour fire resistance rating is required. Further evaluation might be needed where a 2-hour fire resistance rating is required. Additional guidelines can be found in Appendix D of NFPA 914, *Recommended Practice for Fire Protection in Historic Structures*, and in the *SFPE Handbook of Fire Protection Engineering*.

A.7.1.3.2.3 This provision prohibits the use of exit enclosures for storage or for installation of equipment not necessary for safety. Occupancy is prohibited other than for egress, refuge, and access. The intent is that the exit enclosure essentially be “sterile” with respect to fire safety hazards.

A.7.1.5 For the purpose of this requirement, projections include devices such as lighting equipment, emergency signaling equipment, environmental controls and equipment, security devices, signs, and decorations that are typically limited in area.

A.7.1.6.4 The foreseeable conditions are the conditions that are likely to be present at the location of the walking surface during the use of the building or area. A foreseeable condition of a swimming pool deck is that it is likely to be wet.

Regarding the slip resistance of treads, it should be recognized that, when walking up or down stairs, a person’s foot exerts a smaller horizontal force against treads than is exerted when walking on level floors. Therefore, materials used for floors that are acceptable as slip resistant (as described by ASTM F 1637, *Standard Practice for Safe Walking Surfaces*) provide adequate slip resistance where used for stair treads. Such slip resistance includes the important leading edges of treads, the part of the tread that the foot first contacts during descent, which is the most critical direction of travel. If stair treads are wet, there is an increased danger of slipping, just as there is an increased danger of slipping on wet floors of similar materials. A small wash or drainage slope on exterior stair treads is, therefore, recommended to shed water. (See *Templer, J. A., The Staircase: Studies of Hazards, Falls, and Safer Design*, Cambridge, MA: MIT Press, 1992.)

A.7.1.7.2 Aside from the problems created for persons who are mobility impaired, small changes of elevations in floors are best avoided because of the increased occurrence of missteps

where the presence of single steps, a series of steps, or a ramp is not readily apparent. While small changes of elevation pose significant fall risks in the case of individual movement, they are even more undesirable where crowds traverse the area.

A contrasting marking stripe on each stepping surface can be helpful at the nosing or leading edge so that the location of each step is readily apparent, especially when viewed in descent. Such stripes should be not less than 1 in. (2.5 cm) but should not exceed 2 in. (5.0 cm) in width. Other methods could include a relatively higher level of lighting, contrasting colors, contrasting textures, highly prominent handrails, warning signs, a combination thereof, or other similar means. The construction or application of marking stripes should be such that slip resistance is consistent over the walking surface and no tripping hazard is created (*see also A.7.2.3.3*). Depending on the distractions of the surroundings, the familiarity of users with a particular small change of level, and especially the number of people that might be in a group traversing the change of level (thereby reducing visibility of the level changes), a strong argument can be made for the elimination of steps and ramps that might pose a risk of missteps.

A.7.1.10.1 A proper means of egress allows unobstructed travel at all times. Any type of barrier including, but not limited to, the accumulations of snow and ice in those climates subject to such accumulations is an impediment to free movement in the means of egress.

A.7.2.1.1.3 Although 7.2.1.1.3 and 7.2.1.5.1 permit locking of means of egress doors where a building is not considered occupied, the *Code* does not intend to permit occupants to be locked beyond their control in buildings or building spaces, except for detention and correctional occupancies and health care occupancies.

A.7.2.1.2.1 Figures A.7.2.1.2.1(a) and A.7.2.1.2.1(b) illustrate the method of measuring door width for purposes of calculating egress capacity.

FIGURE A.7.2.1.2.1(a) Door width – egress capacity.

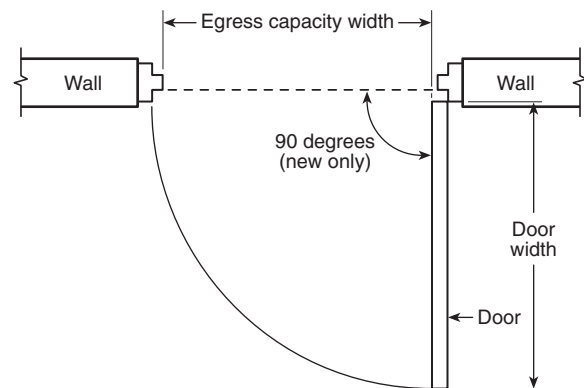
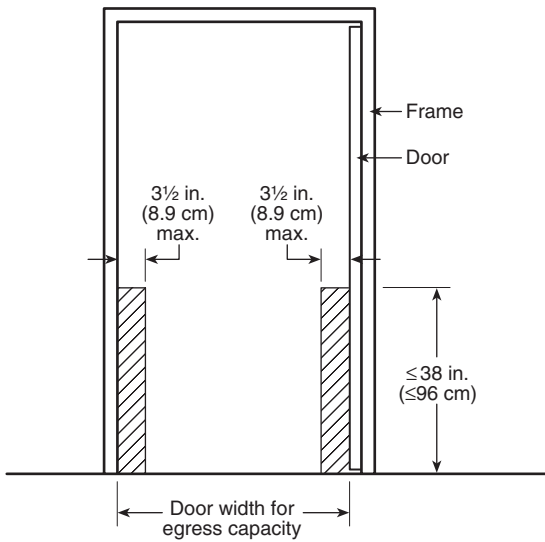


FIGURE A.7.2.1.2.1(b) Door width – egress capacity with permitted obstructions.



A.7.2.1.2.2 Figures A.7.2.1.2.2(a) and A.7.2.1.2.2(b) illustrate the method of measuring clear width for doors.

In cases where a chapter requires a door width, for example, of not less than 36 in. (91 cm), this requirement can be met by a door leaf of the minimum specified width if the term *clear width* does not appear as part of the minimum width requirement. A pair of cross-corridor doors subject to such a requirement would be judged under the following criteria:

- (1) Each door leaf is required to be not less than 36 in. (91 cm) in width.
- (2) The pair of doors is required to provide sufficient, clear, unobstructed width (which will be less than the door leaf width measurement) to handle its assigned occupant load, based on a calculation using the appropriate egress capacity factor in Table 7.3.3.1.

Where swinging doors do not open at least 90 degrees, the clear width of the doorway should be measured between the face of the door and the stop.

It is not the intent to regulate projections above the 80-in. (203-cm) height.

FIGURE A.7.2.1.2.2(a) Minimum clear width.

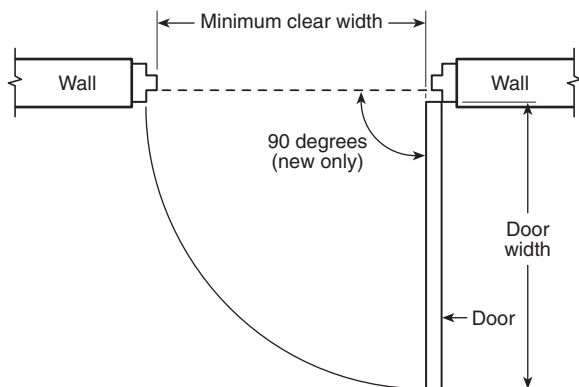
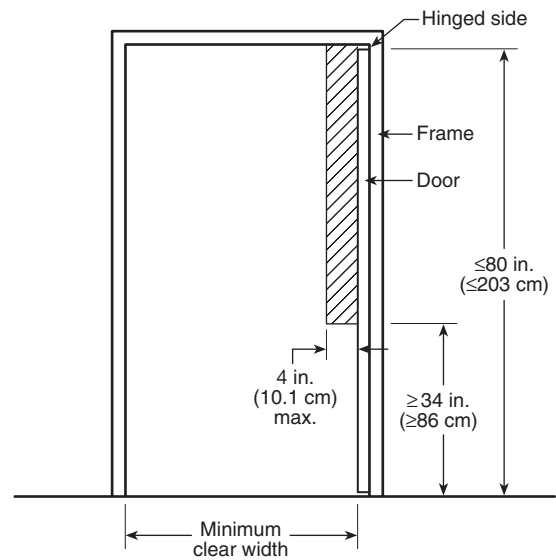


FIGURE A.7.2.1.2.2(b) Minimum clear width with permitted obstructions.



A.7.2.1.4.1 Where doors are subject to two-way traffic, or where their opening can interfere with pedestrian traffic, an appropriately located vision panel can reduce the chance of accidents.

Swinging doors in horizontal or vertical rolling partitions complying with the following should be permitted in a means of egress where the following criteria are met:

- (1) The door or doors comply with 7.2.1.4.
- (2) The partition in which the doors are mounted complies with the applicable fire protection rating and closes upon smoke detection or power failure at a speed not exceeding 9 in./s (23 cm/s) and not less than 6 in./s (15 cm/s).
- (3) The doors mounted in the partition are self-closing or automatic-closing in accordance with 7.2.1.8.

A.7.2.1.4.4 The requirement of 7.2.1.4.4 is not intended to apply to the swing of cross-corridor doors such as smoke barrier doors and horizontal exits.

A.7.2.1.5.2 It is intended that the re-entry provisions apply only to enclosed exit stairs, not to outside stairs. This arrangement makes it possible to leave the stairway at such floor if the fire renders the lower part of the stair unusable during egress or if the occupants seek refuge on another floor.

A.7.2.1.5.4 Examples of devices that might be arranged to release latches include knobs, levers, and panic bars. This requirement is permitted to be satisfied by the use of conventional types of hardware, whereby the door is released by turning a lever, knob, or handle or by pushing against a panic bar, but not by unfamiliar methods of operation such as a blow to break glass. The operating devices should be capable of being operated with one hand and should not require tight grasping, tight pinching, or twisting of the wrist to operate.

A.7.2.1.5.4 Exception No. 1 Examples of devices that, when used with a latch, can be arranged to require not more than one additional releasing operation include night latches, dead bolts, and security chains.

A.7.2.1.5.6 Examples of devices prohibited by this requirement include locks, padlocks, hasps, bars, chains, or combinations thereof.

A.7.2.1.6.1(d) In the event that the authority having jurisdiction has permitted increased operation time, the sign should reflect the appropriate time.

A.7.2.1.8.1 Examples of doors designed to normally be kept closed include those to a stair enclosure or horizontal exit.

A.7.2.1.9 Powered doors are divided into two categories — power assisted and power operated. Power-assisted doors that conform to ANSI/BHMA A156.19, *American National Standard for Power Assist & Low Energy Power Operated Doors*, use limited power to operate the door. They require fewer safeguards as compared to full power-operated doors. These door operators are for swinging doors only. Power-operated doors that conform to ANSI/BHMA A156.10, *American National Standard for Power Operated Pedestrian Doors*, require more power to operate the door and require additional safeguards to provide protection against personal injury. Power-operated doors can be swinging, sliding, or folding doors.

A.7.2.1.9.1 An example of the type of door addressed by 7.2.1.9.1 is one actuated by a motion-sensing device upon the approach of a person.

A.7.2.1.9.1 Exception No. 2 Although a single power-operated door leaf located within a two-leaf opening might alone not provide more than 30 in. (76 cm) of clear width in the emergency breakout mode, where both leaves are broken out to become side-hinged, the required egress width is permitted to be provided by the width of the entire opening.

A.7.2.2.1(b) It is the intent of 7.2.2.1(b) to permit the use of Table 7.2.2.1(b) in existing buildings, even where there is a change in occupancy per 4.6.11. Safety improvements should be made that are reasonable and feasible at minimal cost. Improvements include removal, repair, or replacement of step coverings as described in A.7.2.2.3.5, particularly Figure A.7.2.2.3.5(e), and addition of functional handrails and guardrails in place of or in conjunction with other rails as described in 7.2.2.4.

A.7.2.2.2.4 If properly designed and constructed, stairs with winders are not necessarily more dangerous than other stairs. Attention to the following factors helps to make winders generally more effective for egress and safety. Handrails should be continuous, without breaks at newel posts, from story to story. Handrails located at a greater than normal distance from the inner turn of winders can improve safety by constraining stair users to walk on the portion of the treads providing deeper treads, which should have not less than 11 in. (27.9 cm) of depth. Combinations of straight flights and winders are best arranged with winders located only below the straight flight. This arrangement is best because the winders provide larger tread dimensions over much of their width than do typical treads on straight flights. A descending person will, thus, be unlikely to experience a reduction of tread depth during descent, a condition of nonuniformity that is best avoided.

A.7.2.2.3.3 The tripping hazard referred to in 7.2.2.3.3 occurs especially during descent, where the tread walking surface has projections such as strips of high-friction materials or lips from metal pan stairs that are not completely filled with concrete or other material. Tread nosings that project over adjacent treads can also be a tripping hazard. CABO/ANSI A117.1, *American*

National Standard for Accessible and Usable Buildings and Facilities, illustrates projecting nosing configurations that minimize the hazard.

Where environmental conditions (such as illumination levels and directionality or a complex visual field that draws a person's attention away from stair treads) lead to a hazardous reduction in one's ability to perceive stair treads, they should be made of a material that allows ready discrimination of the number and position of treads. In all cases, the leading edges of all treads should be readily visible during both ascent and descent. A major factor in injury-producing stair accidents and in the ability to use stairs efficiently in conditions such as egress is the clarity of the stair treads as separate stepping surfaces.

A.7.2.2.3.4 A small drainage slope for stair treads subject to wetting can improve tread slip resistance (see also A.7.2.2.3.3). A consistent slope to a side of the stair, where drainage is possible, might be preferable to a front-to-back slope of the treads. Providing a pitch of $1/8$ in. to $1/4$ in./ft (1 cm to 2 cm/m) aids the shedding of water from a nominally horizontal surface.

A.7.2.2.3.5 Figures A.7.2.2.3.5(a), (b), (c), and (d) illustrate the method for measuring riser height and tread depth. Stairs that are covered with resilient floor coverings might need additional tread depth beyond the minimum specified in the Code. Any horizontal projection of resilient covering materials beyond the tread nosing and riser, such as carpet and underlayment, can interfere with users' feet and thereby reduce usable tread depth. At the tread nosing, such resilient covering materials might not be capable of providing stable support for users' feet. Generally, effective tread depth is reduced by the uncompressed thickness of such resilient coverings and might be further reduced over time if coverings are not well secured and consequently move forward at the nosings. (See Figure A.7.2.2.3.5(e).)

FIGURE A.7.2.2.3.5(a) Riser measurement with tread slope to front.

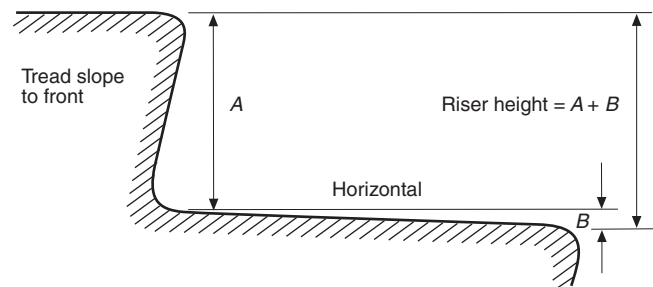


FIGURE A.7.2.2.3.5(b) Riser measurement with tread slope to back.

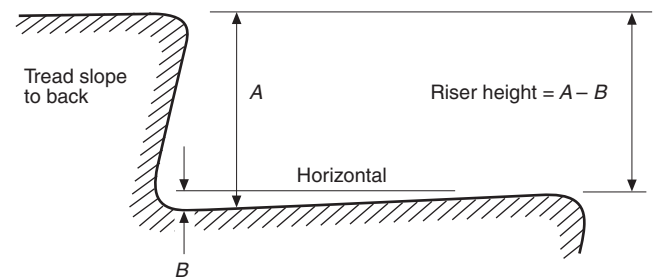


FIGURE A.7.2.2.3.5(c) Tread depth.

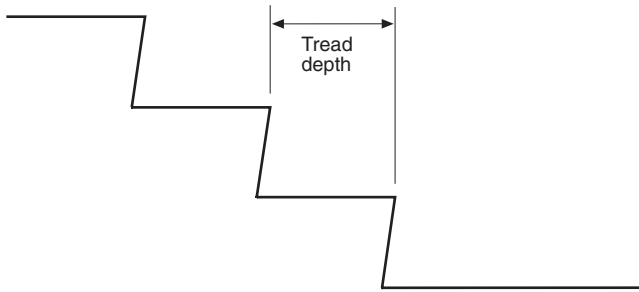


FIGURE A.7.2.2.3.5(d) Tread measurement with stable support at leading edge.

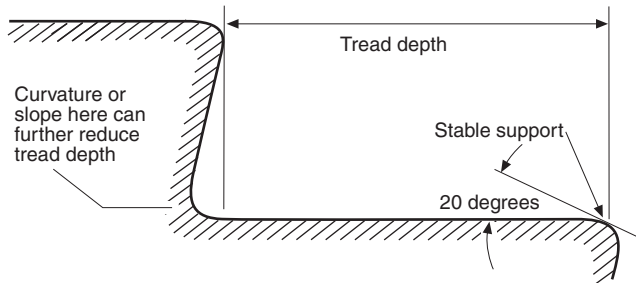
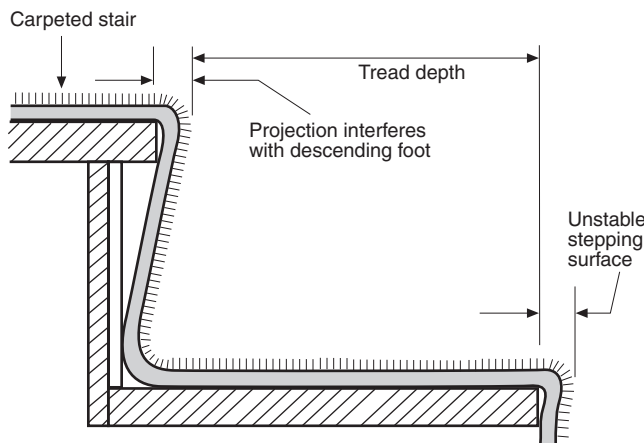


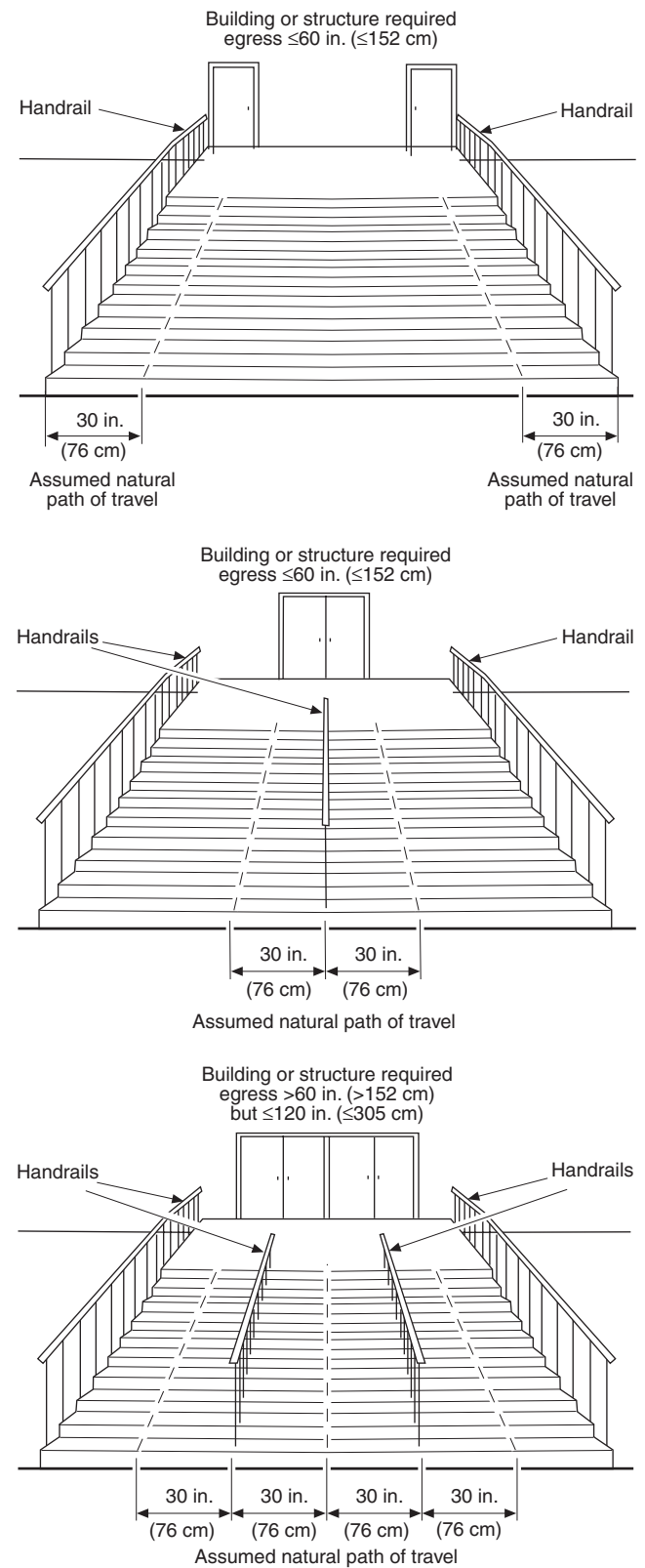
FIGURE A.7.2.2.3.5(e) Tread measurement with unstable stepping surface at leading edge.



A.7.2.2.4.1 Means of egress components that might require protection with guards include stairs, landings, balconies, corridors, passageways, floor or roof openings, ramps, aisles, porches, and mezzanines.

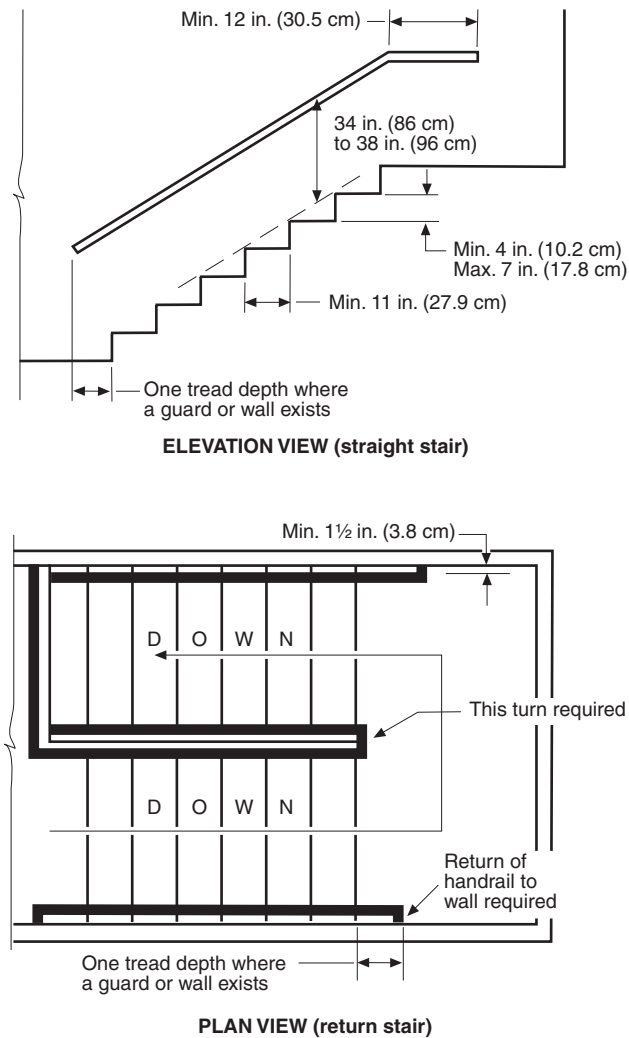
A.7.2.2.4.2 The intent of this provision is to place handrails for the required egress width only, regardless of the actual width. The required egress width is provided along the natural path of travel to and from the building. Examples of this requirement are shown in Figure A.7.2.2.4.2. The reduced intermediate handrail spacing of 60 in. (152 cm) along with a handrail height within the permissible height limits allows users to reach and grasp one handrail. Except as noted in 7.2.2.4.3 and 7.2.2.4.5, handrails are not required on stair landings.

FIGURE A.7.2.2.4.2 Assumed natural paths of travel on monumental stairs with various handrail locations.



A.7.2.2.4.5 Figure A.7.2.2.4.5 illustrates some of the requirements of 7.2.2.4.5.

FIGURE A.7.2.2.4.5 Handrail details.



A.7.2.2.4.5 Exception No. 3 Additional handrails, beyond those required by the *Code*, are permitted at heights other than those stipulated. For example, where children under the age of 5 are major users of a facility, an additional handrail at a height in the range of 28 in. to 32 in. (71 cm to 81 cm) might be useful. Generally, children prefer to use, and can effectively use, handrails that are located at shoulder to head height due to their developmental characteristics and their less developed balance and walking abilities. At age 3, head height ranges from 35 in. to 40 in. (89 cm to 102 cm); shoulder height averages 29 in. (74 cm). At age 5, head height ranges from 39 in. to 46 in. (99 cm to 117 cm); shoulder height ranges from 31 in. to 37 in. (79 cm to 94 cm).

A.7.2.2.4.5(2) This 1½-in. (3.8-cm) clearance assumes that the wall and other surfaces adjacent to the handrail are smooth. Where rough surfaces are used, greater clearances are recommended. Ergonomic studies suggest that not less than 2¼ in. (5.7 cm) is a more appropriate clearance, even to smooth surfaces. It is important to note that the 3½-in. (8.9-

cm) projection allowance of Tables 7.2.2.2.1(a) and (b) and 7.3.2 does not prohibit such larger clearances; the 3½ in. (8.9 cm) refers to stair width required for egress capacity, for example, not the actual width.

A.7.2.2.4.5(3) Handrails should be designed so they can be grasped firmly with a comfortable grip and so the hand can be slid along the rail without encountering obstructions. The profile of the rail should comfortably match the hand grips. For example, a round profile such as is provided by the simplest round tubing or pipe having an outside diameter of 1½ in. to 2 in. (3.8 cm to 5 cm) provides good graspability for adults. Factors such as the use of a handrail by small children and the wall-fixing details should be taken into account in assessing handrail graspability. The most functional as well as the most preferred handrail shape and size is circular with a 1½-in. (3.8-cm) outside diameter (according to research conducted using adults). Handrails used predominantly by children should be designed at the lower end of the permitted dimensional range.

Handrails are one of the most important components of a stair; therefore, design excesses such as oversized wood handrail sections should be avoided unless there is a readily perceived and easily grasped handhold provided. In handrail design, it is useful to remember at all times the effectiveness of a simple round profile that allows some locking action by fingers as they curl around the handrail.

Perimeter dimension, referred to in the exception to 7.2.2.4.5(3), is the length of the shortest loop that wraps completely around the railing.

A.7.2.2.4.6 Exception No. 3 This reduction in required height applies only to the stair, not to the landings.

A.7.2.2.4.6(3) Vertical intermediate rails are preferred to reduce climbability.

A.7.2.2.5.2 The purpose of this provision is to protect the exterior wall of a stairway from fires in other portions of the building. If the exterior wall of the stair is flush with the building exterior wall, the fire would need to travel around 180 degrees in order to impact the stair. This has not been a problem in existing buildings, so no protection is required. However, if the angle of exposure is less than 180 degrees, protection of either the stair wall or building wall is required.

Figures A.7.2.2.5.2 (a), (b), and (c) illustrate the requirement, assuming nonrated glass on the exterior wall of the stair is used.

FIGURE A.7.2.2.5.2(a) Stairway with nonrated exterior wall in same plane as building exterior wall.

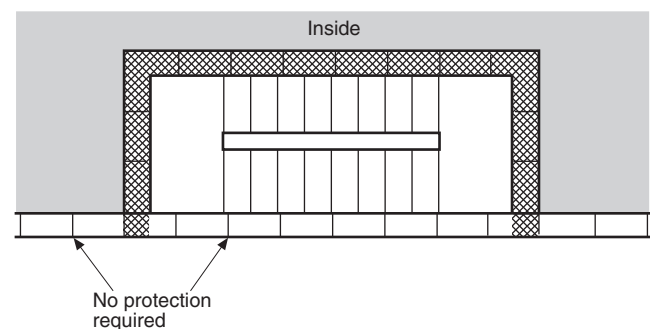


FIGURE A.7.2.2.5.2(b) Stairway with unprotected exterior perimeter protruding past building exterior wall.

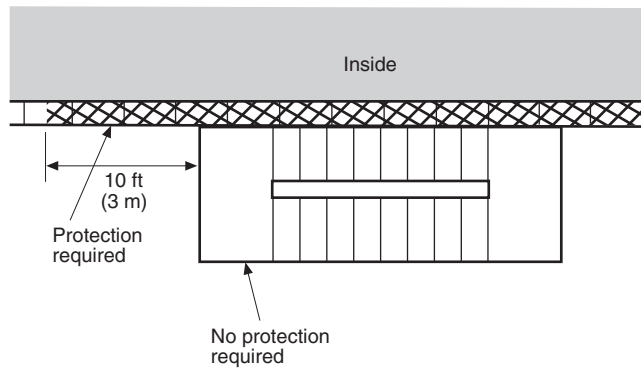
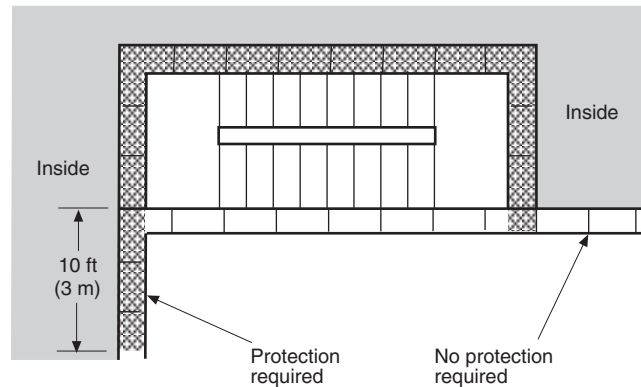


FIGURE A.7.2.2.5.2(c) Stairway with nonrated exterior wall exposed by adjacent exterior wall of building.



A.7.2.2.5.3 An example of a use with the potential to interfere with egress is storage.

A.7.2.2.5.4 The intent of this provision is to provide vital egress information to the occupants of a building and to fire fighters. To reduce information overload to occupants during emergency egress, a sign indicating the floor level and the direction to the exit discharge is permitted to be placed as a separate sign with another sign indicating the floor level, the terminus of the top and bottom of the stair enclosure, and the identification of the stair.

A.7.2.2.6.2 The guards that are required by 7.2.2.4 will usually meet this requirement where the stair is not more than three stories high. Special architectural treatment, including application of such devices as metal or masonry screens and grilles, will usually be necessary to comply with the intent of this requirement for stairs over three stories in height.

A.7.2.2.6.5 See A.7.2.2.3.4.

A.7.2.3.9.1 The design pressure differences required by 7.2.3.9.1 are based on specific gas temperatures and ceiling heights. The system is required to be approved because antic-

ipated conditions might be different from those on which the design pressure differences were calculated and, thus, different design pressure differences might be needed. For additional information on necessary minimum design pressure differences, including calculational techniques, or maximum pressure differences across doors to ensure reasonable operating forces, see NFPA 92A, *Recommended Practice for Smoke-Control Systems*.

A.7.2.4.1.2 Example. One way to provide the required egress capacity from the upper floor of a department store building 350 ft \times 200 ft (107 m \times 60 m), with an occupant load of 1166 per floor, would be to furnish eight 44-in. (112-cm) stairs. (See Figure A.7.2.4.1.2(a).)

Assume that this building is divided into two sections by a fire barrier meeting the requirements for a horizontal exit, one 130 ft \times 200 ft (40 m \times 60 m) and the other 220 ft \times 200 ft (67 m \times 60 m), with two pairs of 46-in. (117-cm) double egress doors, with each door providing 44 in. (112 cm) of clear egress width (see Figure A.7.2.4.1.2(b)). The smaller section, considered separately, will require the equivalent of three 44-in. (112-cm) exit stairs and the larger section will require five such exits. The horizontal exits will serve as one of the three exits required for the smaller section and two of the five exits required for the larger section. Therefore, only two 44-in. (112-cm) exit stairs from the smaller section and three 44-in. (112-cm) exit stairs from the larger section will be required, if the exits can be arranged to meet the requirements for the 150-ft (45-m) travel distance permitted from any point in a nonsprinklered building. Thus, the total number of exit stairs required for the building will be five, as compared with eight if no horizontal exit had been provided.

Another option would be the use of two 56-in. (142-cm) exit stairs from the larger section, which would reduce the total number of stairways required from the floor to four (see Figure A.7.2.4.1.2(c)). However, if the building were further subdivided by a second fire wall meeting the requirements for a horizontal exit, no further reduction in stairways would be permitted in order to comply with the requirement that horizontal exits provide a maximum of one-half of egress capacity.

FIGURE A.7.2.4.1.2(a) Eight exits, none via horizontal exit, required to provide the necessary egress capacity.

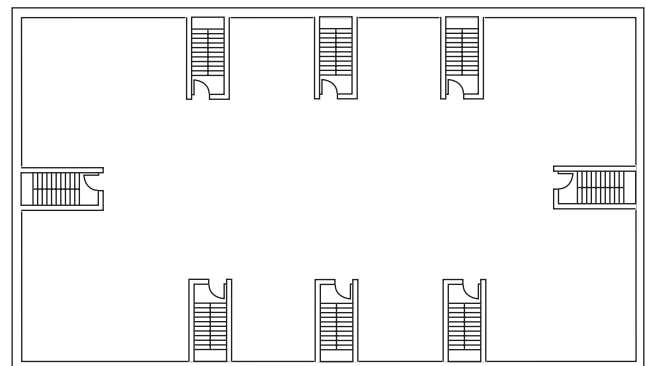


FIGURE A.7.2.4.1.2(b) Number of stairs reduced by three through use of two horizontal exits; egress capacity not reduced.

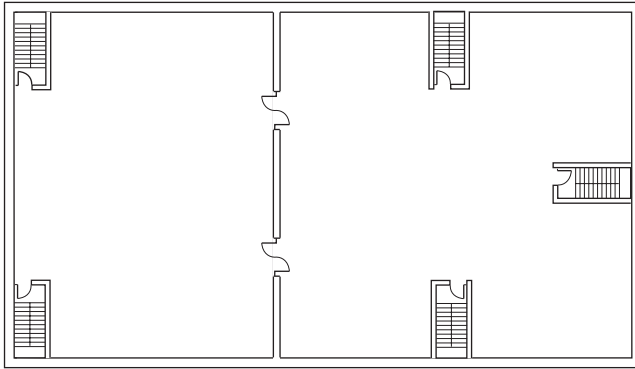
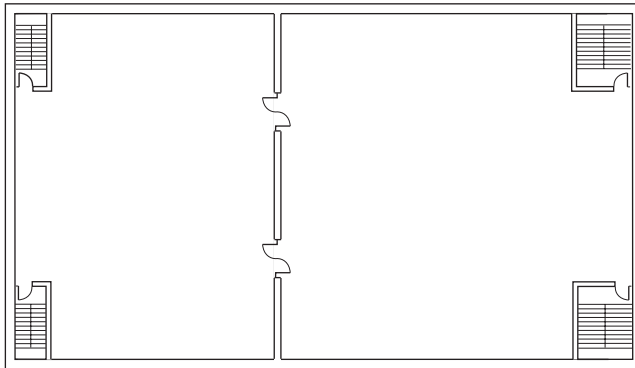


FIGURE A.7.2.4.1.2(c) Number of stairs further reduced by widening stairs in larger compartment, but not to less than one-half the required number and capacity of exits from that compartment.



A.7.2.4.3.7 For further information, see NFPA 105, *Recommended Practice for the Installation of Smoke-Control Door Assemblies*.

A.7.2.4.3.8 Fusible link-actuated automatic-closing doors do not qualify for use in horizontal exits under these provisions, as smoke might pass through the opening before there is sufficient heat to release the hold-open device.

Such doors are also objectionable because, once closed, they are difficult to open and would inhibit orderly egress.

A.7.2.5.6.1 The guards required by 7.2.2.4 for the unenclosed sides of ramps will usually meet this requirement where the ramp is not more than three stories high. Special architectural treatment, including application of such devices as metal or masonry screens and grilles, will usually be necessary to comply with the intent of the requirements for ramps over three stories in height.

A.7.2.5.6.2 Providing a pitch of $1/8$ in. to $1/4$ in./ft (1 cm to 2 cm/m) will aid the shedding of water from a nominally horizontal surface.

A.7.2.6 An exit passageway serves as a horizontal means of exit travel that is protected from fire in a manner similar to an enclosed interior exit stair. Where it is desired to offset exit stairs in a multistory building, an exit passageway can be used to preserve the continuity of the protected exit by connecting the bottom of one stair to the top of the stair that continues to

the street floor. Probably the most important use of an exit passageway is to satisfy the requirement that at least 50 percent of the exit stairs discharge directly outside from multistory buildings (see 7.7.2). Thus, if it is impractical to locate the stair on an exterior wall, an exit passageway can be connected to the bottom of the stair to convey the occupants safely to an outside exit door. In buildings of extremely large area, such as shopping malls and some factories, the exit passageway can be used to advantage where the travel distance to reach an exit would otherwise be excessive.

A.7.2.6.1 Examples of building elements that might be arranged as exit passageways include hallways, corridors, passages, tunnels, underfloor passageways, or overhead passageways.

A.7.2.6.4 Exception No. 1 Where an exit passageway serves occupants on the level of exit discharge as well as other floors, it should not be required that the occupant loads be added, thus increasing the width of the exit passageway. The situation is the same as that in which occupants from the level of exit discharge join occupants from upper floors for a few feet of horizontal travel through a stair enclosure.

A.7.2.8.7 Swinging stairs, although superior to fire escape ladders, are generally unsatisfactory, even for emergency use. Although such stairs are permitted by this *Code*, they should not be used where it is reasonably possible to terminate the fire escape stair at the ground.

A.7.2.8.7.9 A latch is desirable for holding swinging stairs down after they have swung to the ground.

A.7.2.11 Special consideration should be given prior to the application of such devices where children, the elderly, or physically disabled persons use such devices. These devices present obstacles in ascent and descent that differ from those for stairs and ladders.

A.7.2.12.2.3 The clear width of not less than 48 in. (122 cm) is needed for a three-person carry of an occupied wheelchair up or down a stair. This procedure, as well as the more difficult two-person wheelchair carry or roll, requires training and experience. Safer, alternative stair descent measures for transporting a person who normally requires a wheelchair include evacuation chairs and self-braking stair descent devices. In addition to having such devices available where needed, and having persons trained and experienced in their use, it is important to have people trained and experienced in wheelchair transfer techniques.

In view of the logistical difficulties as well as the dangers inherent in carrying occupied wheelchairs or otherwise transporting their occupants on stairs, the preferred means of egress from an area of refuge consists of facilities normally employed for ingress and egress by people using wheelchairs. Foremost among these options are elevators meeting the fire-fighter service requirements of ASME/ANSI A17.1, *Safety Code for Elevators and Escalators*.

A.7.2.12.2.4 The use of elevators for egress, especially during an emergency such as a fire, is not an approach to be taken without considerable planning, ongoing effort, and a high degree of understanding by everyone involved with the evacuation of persons with mobility impairments. Due in part to the limited capacity of elevators, as well as to the conflicting demands for elevator use for fire-fighting activities, even elevators in accordance with 7.2.12.2.4 cannot be considered as sat-

ifying any of the *Code's* requirements for egress capacity, number of means of egress, or travel distance to an exit.

A.7.2.12.2.6 The instructions should include the following:

- (1) Directions to find other means of egress
- (2) Advice that persons able to use exit stairs do so as soon as possible, unless they are assisting others
- (3) Information on planned availability of assistance in the use of stairs or supervised operation of elevators and how to summon such assistance
- (4) Directions for use of the emergency communication system

To facilitate an adequate degree of understanding of the use of areas of refuge and of the associated assisted egress procedures, information should be provided to those using the facilities. The exact content of the information, its organization (for example, as a set of instructions), and its format (for example, either posted instructions in the area of refuge or information otherwise transmitted to facility users) should be determined on a case-by-case basis. The information should be tailored to the specific facility, its emergency plan, the intended audience, and the intended presentation format. The following provides suggested information content addressing two situations.

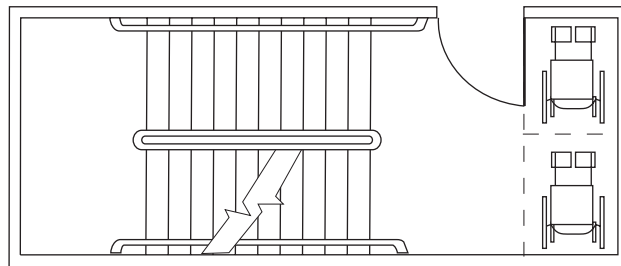
(a) *Refuge with Elevator Use.* An area of refuge provided in the elevator lobby serves as a staging area for persons unable to use stairs and needing assistance for their evacuation during an emergency. The elevator(s) will be taken out of automatic service and operated by emergency service personnel. Persons unable to evacuate down the exit stairs without assistance and needing transportation by elevator should make certain the elevator lobby doors are closed while they wait in the elevator lobby for assistance. The two-way communication system should be used if there is a delay of more than several minutes in the arrival of an elevator that will provide transportation to the ground floor. Alternatively, another refuge area, and assistance with evacuation, is available in the designated exit stair.

(b) *Refuge with Stair Use.* An area of refuge within the designated exit stair serves as a staging area for persons needing assistance for their evacuation during an emergency. Persons unable to use the stairs unassisted, or who wish to move down the stairs at a slower pace, should wait on the stair landing. The two-way communication system should be used if assistance is needed.

A.7.2.12.3.1 Figure A.7.2.12.3.1 illustrates the application of the minimum space requirement to an area of refuge located within an exit stair enclosure. Note that each of the two required spaces is sufficient to allow the parking of a standard wheelchair. Preferably, such spaces should be provided adjacent to each other in a location where the presence of people taking temporary shelter in an area of refuge will be immediately apparent to rescue personnel and other evacuees.

A.7.2.12.3.2 The method of meeting the tenability performance criteria required of an area of refuge of less than 1000 ft² (93 m²) can involve controlling the exposing fire (for example, via automatic sprinkler protection), installing smoke-resisting doors in the smoke-resisting barriers (see *NFPA 105, Recommended Practice for the Installation of Smoke-Control Door Assemblies*), providing smoke control to prevent or limit smoke migration through cracks or other leakage paths (see *NFPA 92A, Recommended Practice for Smoke-Control Systems*), or providing other means or a combination of these means.

FIGURE A.7.2.12.3.1 Exit stair used as an area of refuge.



Calculations, if used, need to be based on established engineering relationships and equations. Such calculational procedures are described in NFPA 92A, *Recommended Practice for Smoke-Control Systems, Design of Smoke Management Systems*, and the *SFPE Handbook of Fire Protection Engineering*. Tenable conditions are those that maintain the temperature of any smoke in the area of refuge at less than 200°F (93°C) if the smoke is more than 5 ft (1.5 m) above the floor, and at less than 120°F (49°C) if the smoke descends below the 5-ft (1.5-m) level in the area of refuge. Also, if the smoke descends below the 5-ft (1.5-m) level, tenable conditions require not less than 16 percent oxygen and not more than 30,000 ppm/min exposure to carbon monoxide. The exposing conditions used in the calculations should be in accordance with the following:

- (1) The exposing space is sprinkler protected: the temperature of the exposing smoke is 200°F (93°C), the smoke layer extends to the floor, the oxygen content is 16 percent, and the carbon monoxide concentration is 2000 ppm (0.2 percent).
- (2) The exposing space is a nonsprinklered corridor finished with Class A interior wall and ceiling finish: the temperature of the exposing smoke is 600°F (315°C), the smoke layer extends to a level 2 ft (0.6 m) above the floor, the oxygen content is 3 percent, and the carbon monoxide concentration is 50,000 ppm (5 percent).
- (3) The exposing space is either not a corridor or, if a corridor, the corridor is not finished with a Class A interior wall and ceiling finish: the temperature of the exposing smoke is 1500°F (815°C), the smoke layer extends to a level 2 ft (0.6 m) above the floor, the oxygen content is 3 percent, and the carbon monoxide concentration is 50,000 ppm (5 percent).

A.7.2.12.3.4 Requirements for fire resistance ratings in excess of 1 hour, fire protection ratings in excess of 20 minutes, and prohibitions on duct penetrations appear in other *Code* sections. For example, if the barrier creating the area of refuge is also part of an exit stair enclosure that connects more than three stories or is a horizontal exit, a fire resistance rating of the barrier of not less than 2 hours and a fire protection rating for opening protectives such as doors of not less than 1¹/₂ hours would be required for most occupancies.

For further information on door openings in smoke-resisting barriers, see NFPA 105, *Recommended Practice for the Installation of Smoke-Control Door Assemblies*.

Generally, by providing one barrier that subdivides a floor area, two areas of refuge can be created. This subdivision method and the possibility of creating areas of refuge within compartmented elevator lobbies or on enlarged stair landings of exit stair enclosures make less onerous any requirement for a story to have more than one accessible means of egress.

A.7.2.13.1 It is the intent of 7.2.13 that elevators serving as a means of egress serve only independent towers or the tower portion of any integral structure. For elevators that are used as a component in the means of egress, the elevator lobbies, elevator shaft, and machine room need to be protected from the effects of fire.

A.7.2.13.6 One or more of the following approaches can be used to restrict exposure of elevator equipment to water:

- (1) A combination of sealed elevator lobby doors, sloped floors, floor drains, and sealed elevator shaft walls is used.
- (2) The elevator is mounted on the building exterior that normally operates in the elements, and seals are used on the elevator lobby doors.
- (3) The elevator shaft is separated from the building at each floor by an exterior elevator lobby designed to prevent water entry into the elevator shaft.

Information gained from ongoing research concerning waterflow and elevators could lead to the development of water-resistive or water-protected elevator equipment specifically for fire applications. Such equipment should be used only with the building elements (for example, sealed elevator lobby doors, sloped floors, floor drains) for which it is developed. Further information is available from the NIST publication, *Feasibility of Fire Evacuation by Elevators at FAA Control Towers*.

A.7.2.13.7 Cooling equipment dedicated to the elevator machine room can be used to minimize requirements for standby power.

A.7.2.13.8 Communication between elevator lobbies and a central control point can be by telephone or intercom. Auditory alarms should be designed so that they do not interfere with people talking on communications systems.

A.7.2.13.9 Smoke detection in the elevator lobby will result in a Phase I recall of the elevators. The elevators will then be automatically taken out of normal service and will be available to be operated by emergency service personnel.

A.7.3.1.2 The normal occupant load is not necessarily a suitable criterion, as the greatest hazard can occur when an unusually large crowd is present, which is a condition often difficult for authorities having jurisdiction to control by regulatory measures. The principle of this *Code* is to provide means of egress for the maximum probable number of occupants rather than to attempt to limit occupants to a number commensurate with available means of egress. However, limits of occupancy are specified in certain special cases for other reasons.

Suggested occupant load factors for components of large airport terminal buildings are given in Table A.7.3.1.2. However, the authority having jurisdiction might elect to use differ-

ent occupant load factors, provided that egress requirements are satisfied.

Table A.7.3.1.2 Airport Terminal Occupant Load Factors

Airport		
Terminal Area	ft² (gross)	m² (gross)
Concourse	100	9.3
Waiting areas	15	1.4
Baggage claim	20	1.9
Baggage handling	300	27.9

Covered Mall Buildings. The figure used in determining the occupancy load for covered mall shopping centers of varying sizes was arrived at empirically by surveying over 270 covered mall shopping centers, by studying mercantile occupancy parking requirements, and by observing the number of occupants per vehicle during peak seasons.

These studies show that, with an increase in shopping center size, there is a decrease in the number of occupants per square foot of gross leasable area.

This phenomenon is explained when one considers that above a certain shopping center gross leasable area (approximately 600,000 ft² (56,000 m²)), there exists a multiplicity of the same types of stores. The purpose of duplicate types of stores is to increase the choices available to a customer for any given type of merchandise. Therefore, when shopping center size increases, the occupant load increases as well, but at a declining rate. In using Table 7.3.1.2, the occupant load factor is applied only to the gross leasable area that uses the covered mall as a means of egress.

A.7.3.2 For further information on stair capacity, see Chapter 2 of the 1998 edition of NFPA 101A, *Guide on Alternative Approaches to Life Safety*.

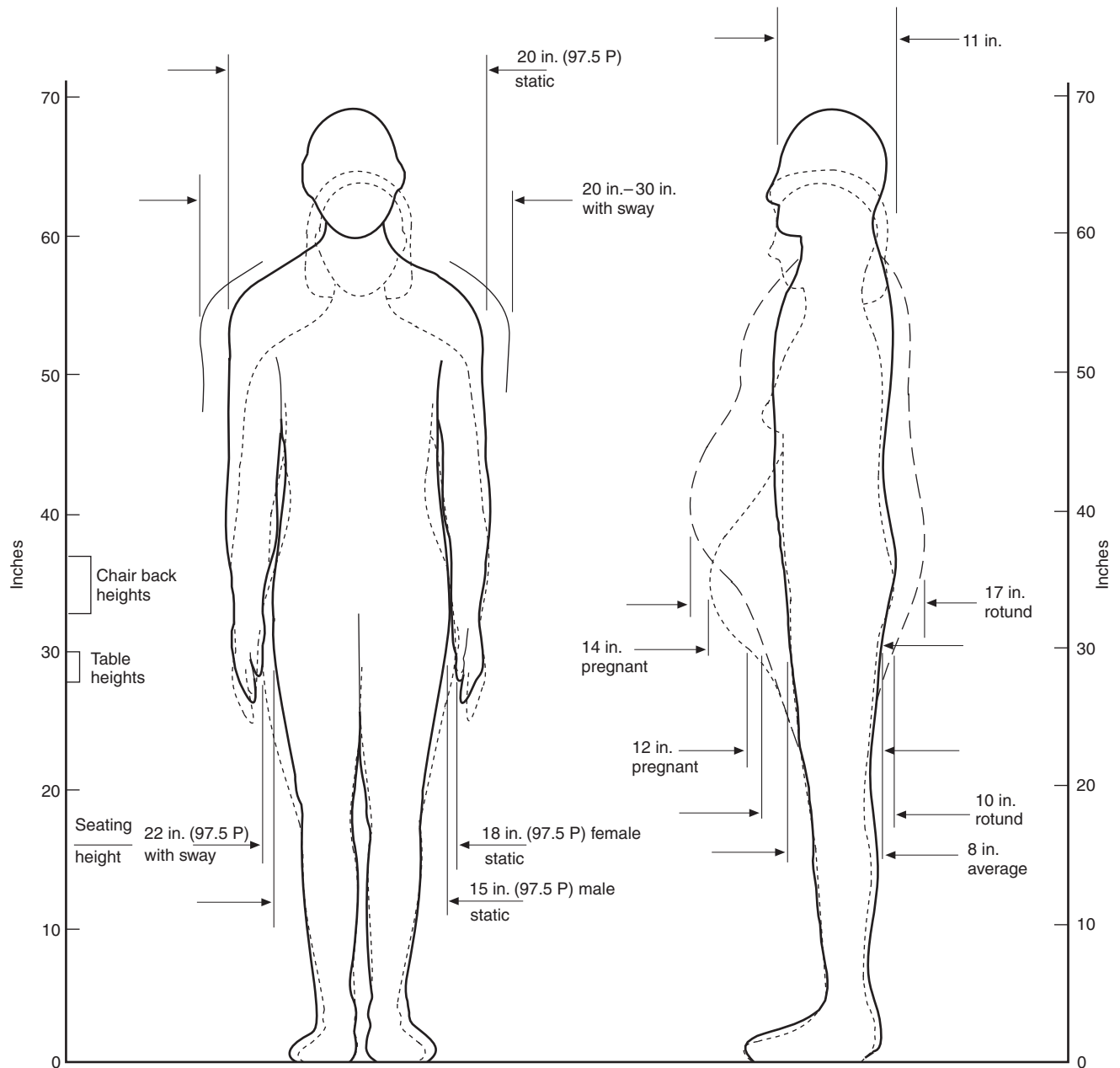
A.7.3.4.1 Exception No. 1 This exception provides for minimum widths for small spaces such as individual offices. The intent is that this exception applies to spaces formed by furniture and movable walls so that accommodations can easily be made for mobility-impaired individuals. One side of a path could be a fixed wall, provided that the other side is movable. This does not exempt the door widths or widths of fixed-wall corridors, regardless of the number of people or length.

Figure A.7.3.4.1 presents selected anthropometric data for adults. The male and female figures depicted in the figure are average, 50th percentile, in size. Some dimensions apply to very large, 97.5 percentile, adults (noted as 97.5 P).

A.7.5.1.2 See A.7.5.1.6.

A.7.5.1.4 Figures A.7.5.1.4(a) through (e) illustrate the method of measurement intended by 7.5.1.4.

FIGURE A.7.3.4.1 Anthropometric data for adults; male and female figures of average, 50th percentile, size, some dimensions apply to very large, 97.5 percentile (97.5 P), adults.



For SI units, 1 in. = 2.54 cm.

FIGURE A.7.5.1.4(a) Diagonal rule for exit remoteness.

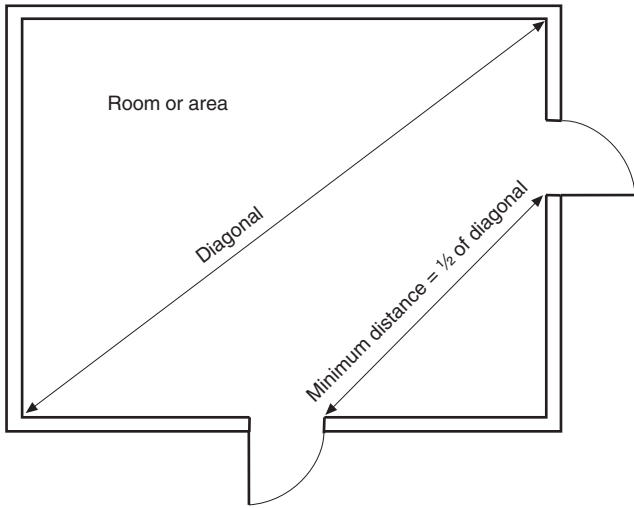


FIGURE A.7.5.1.4(b) Diagonal rule for exit and exit access remoteness.

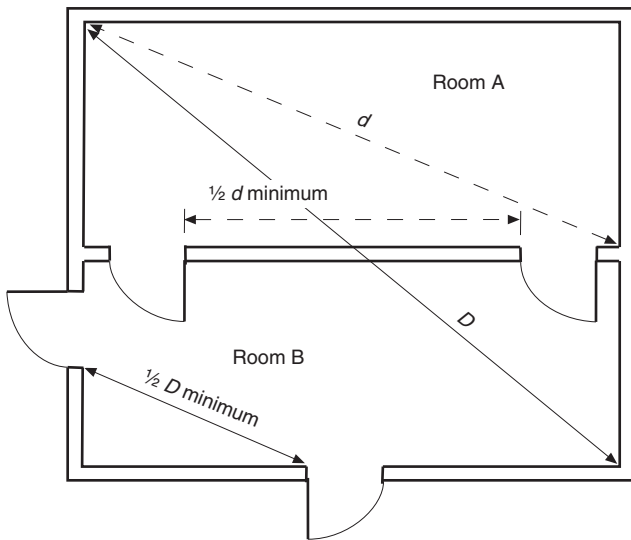


FIGURE A.7.5.1.4(c) Exit separation and diagonal measurement of area served.

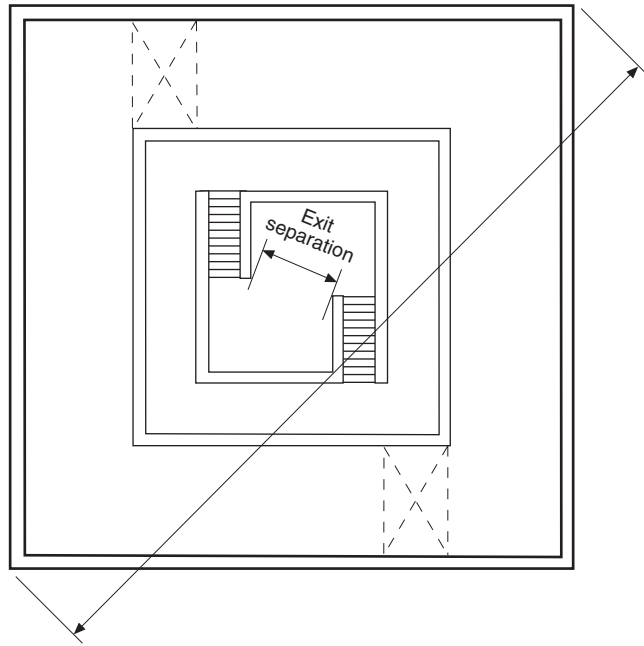


FIGURE A.7.5.1.4(d) Exit separation measured along corridor path.

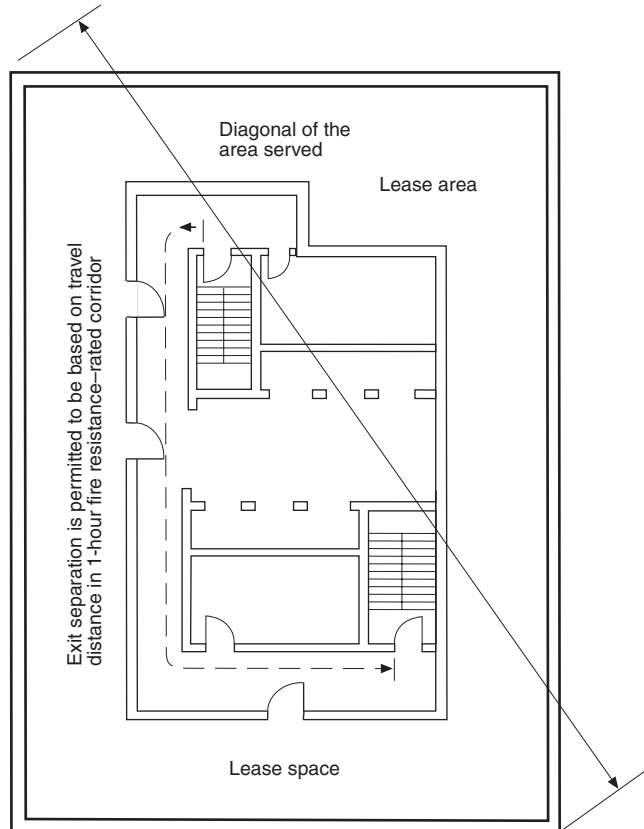
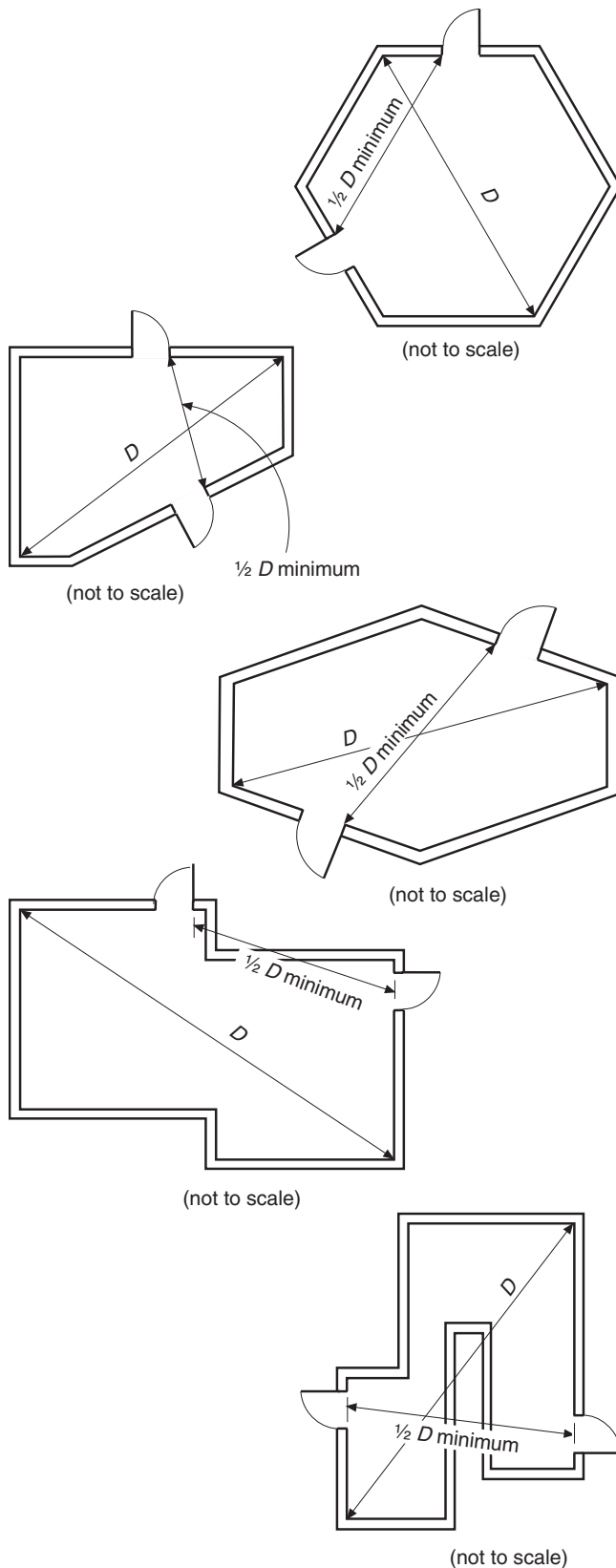


FIGURE A.7.5.1.4(e) Diagonal measurement for unusually-shaped areas.

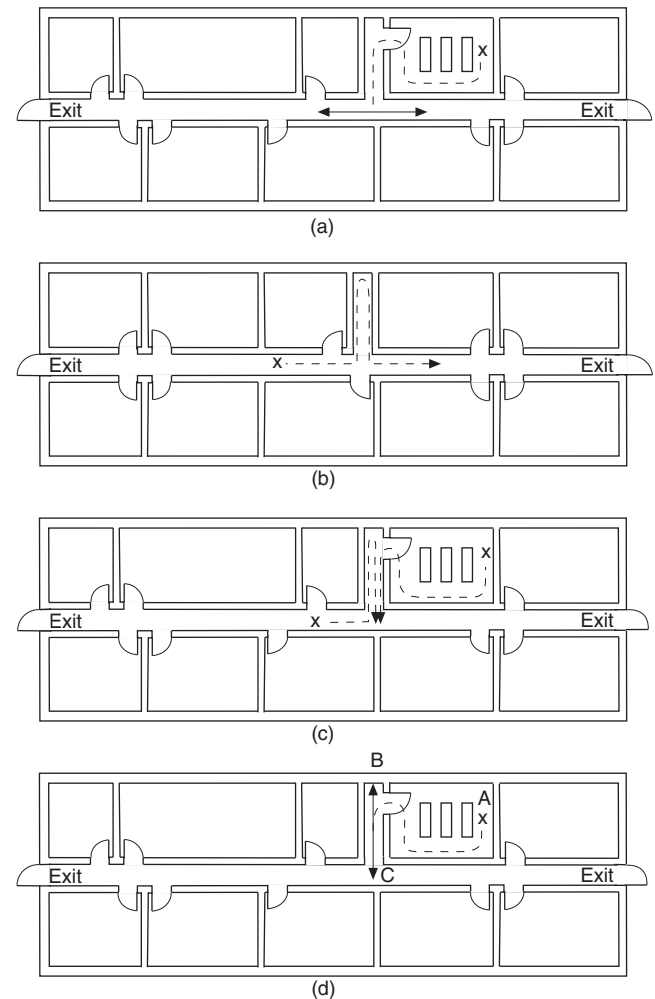


A.7.5.1.5 It is difficult in actual practice to construct scissor stairs so that products of combustion that have entered one stairway do not penetrate into the other. Use as separate required exits is discouraged. The term *limited-combustible* is intentionally not included in 7.5.1.5. The user's attention is directed to the definitions of *limited-combustible* and *noncombustible* in 3.3.118 and 3.3.131, respectively.

A.7.5.1.6 The terms *dead end* and *common path of travel* are commonly used interchangeably. While the concepts of each are similar in practice, they are two different concepts.

A common path of travel exists where a space is arranged so that occupants within that space are able to travel in only one direction to reach any of the exits or to reach the point at which the occupants have the choice of two paths of travel to remote exits. Part (a) of Figure A.7.5.1.6 is an example of a common path of travel.

FIGURE A.7.5.1.6 Common paths of travel and dead-end corridors.



While a dead end is similar to a common path of travel, a dead end can exist where there is no path of travel from an occupied space but can also exist where an occupant enters a corridor thinking there is an exit at the end and, finding none, is forced to retrace his or her path to reach a choice of exits.

Part (b) of Figure A.7.5.1.6 is an example of such a dead-end arrangement.

Combining the two concepts, part (c) of Figure A.7.5.1.6 is an example of a combined dead-end/common path of travel problem.

Common paths of travel and dead-end travel are measured using the same principles used to measure travel distance as described in Section 7.6 of the *Code*. Starting in the room shown in part (d) of Figure A.7.5.1.6, measurement is made from the most remote point in the room, A, along the natural path of travel, and through the doorway along the centerline of the corridor to point C, located at the centerline of the corridor, which then provides the choice of two different paths to remote exits; this is common path of travel. The space between point B and point C is a dead end. (See 3.3.32 for the definition of common path of travel.)

A.7.5.2.2 Doors that lead through wall paneling and that harmonize in appearance with the rest of the wall to avoid detracting from some desired aesthetic or decorative effect are not acceptable, as casual occupants might not be aware of such means of egress even though it is visible.

A.7.5.4.1 An accessible means of egress should comply with the accessible route requirements of CABO/ANSI A117.1, *American National Standard for Accessible and Usable Buildings and Facilities*.

A.7.6.1 Table A.7.6.1 is a compilation of the requirements of the individual occupancy chapters (Chapters 12 through 41) for permissible length of common path of travel, dead-end corridors, and travel distance to not less than one of the required exits.

A dead end exists where an occupant enters a corridor thinking there is an exit at the end and, finding none, is forced to retrace the path traveled to reach a choice of egress travel paths. Although relatively short dead ends are permitted by this *Code*, it is better practice to eliminate them wherever possible, as they increase the danger of persons being trapped in case of fire. Compliance with the dead-end limits does not necessarily mean that the requirements for remoteness of exits have been met. Such lack of compliance is particularly true in small buildings or buildings with short public hallways. Adequate remoteness can be obtained in such cases by further reducing the length of dead ends. (See also A.7.5.1.6.)

Table A.7.6.1 Common Path, Dead-End, and Travel Distance Limits (by occupancy)

Type of Occupancy	Common Path Limit		Dead-End Limit		Travel Distance Limit	
	Unsprinklered ft (m)	Sprinklered ft (m)	Unsprinklered ft (m)	Sprinklered ft (m)	Unsprinklered ft (m)	Sprinklered ft (m)
Assembly						
New	20/75 (6.1/23) ^{a,b}	20/75 (6.1/23) ^{a,b}	0/20 (0/6.1) ^b	0/20 (0/6.1) ^b	150 (45) ^c	200 (60) ^c
Existing	20/75 (6.1/23) ^{a,b}	20/75 (6.1/23) ^{a,b}	0/20 (0/6.1) ^b	0/20 (0/6.1) ^b	150 (45) ^c	200 (60) ^c
Educational						
New	75 (23)	100 (30)	20 (6.1)	50 (15)	150 (45)	200 (60)
Existing	75 (23)	100 (30)	20 (6.1)	50 (15)	150 (45)	200 (60)
Day-Care						
New day-care center	75 (23)	100 (30)	20 (6.1)	50 (15)	150 (45) ^d	200 (60) ^d
Existing day-care center	75 (23)	100 (30)	20 (6.1)	50 (15)	150 (45) ^d	200 (60) ^d
Health Care						
New	NR	NR	30 (9.1)	30 (9.1)	NA	200 (60) ^d
Existing	NR	NR	NR	NR	150 (45) ^d	200 (60) ^d
Ambulatory Health Care						
New	75 (23) ^e	100 (30) ^e	20 (6.1)	50 (15)	150 (45) ^d	200 (60) ^d
Existing	75 (23) ^e	100 (30) ^e	50 (15)	50 (15)	150 (45) ^d	200 (60) ^d

(Sheet 1 of 4)

Table A.7.6.1 Common Path, Dead-End, and Travel Distance Limits (by occupancy) (Continued)

Type of Occupancy	Common Path Limit		Dead-End Limit		Travel Distance Limit	
	Unsprinklered ft (m)	Sprinklered ft (m)	Unsprinklered ft (m)	Sprinklered ft (m)	Unsprinklered ft (m)	Sprinklered ft (m)
Detention and Correctional						
New — Use conditions II, III, IV	50 (15)	100 (30)	50 (15)	50 (15)	150 (45) ^d	200 (60) ^d
New — Use condition V	50 (15)	100 (30)	20 (6.1)	20 (6.1)	150 (45) ^d	200 (60) ^d
Existing — Use conditions II, III, IV, V	50 (15) ^f	100 (30) ^f	NR	NR	150 (45) ^d	200 (60) ^d
Residential						
One- and two-family dwellings	NR	NR	NR	NR	NR	NR
Lodging or rooming houses	NR	NR	NR	NR	NR	NR
Hotels and Dormitories						
New	35 (10.7) ^{g,i}	50 (15) ^{g,i}	35 (10.7)	50 (15)	175 (53) ^{d,h}	325 (99) ^{d,h}
Existing	35 (10.7) ^g	50 (15) ^g	50 (15)	50 (15)	175 (53) ^{d,h}	325 (99) ^{d,h}
Apartments						
New	35 (10.7) ^g	50 (15) ^g	35 (10.7)	50 (15)	175 (53) ^{d,h}	325 (99) ^{d,h}
Existing	35 (10.7) ^g	50 (15) ^g	50 (15)	50 (15)	175 (53) ^{d,h}	325 (99) ^{d,h}
Board and Care						
Small, new and existing	NR	NR	NR	NR	NR	NR
Large, new	NA	125 (38) ⁱ	NA	50 (15)	NA	325 (99) ^{d,h}
Large, existing	110 (33)	160 (49)	50 (15)	50 (15)	175 (53) ^{d,h}	325 (99) ^{d,h}
Mercantile						
Class A, B, C						
New	75 (23)	100 (30)	20 (6.1)	50 (15)	100 (30)	200 (60)
Existing	75 (23)	100 (30)	50 (15)	50 (15)	150 (45)	200 (60)
Open air	NR	NR	0 (0)	0 (0)	NR	NR

(Sheet 2 of 4)

Table A.7.6.1 Common Path, Dead-End, and Travel Distance Limits (by occupancy) (Continued)

Type of Occupancy	Common Path Limit		Dead-End Limit		Travel Distance Limit	
	Unsprinklered ft (m)	Sprinklered ft (m)	Unsprinklered ft (m)	Sprinklered ft (m)	Unsprinklered ft (m)	Sprinklered ft (m)
Mercantile (Continued)						
Covered Mall						
New	75 (23)	100 (30)	20 (6.1)	50 (15)	100 (30)	400 (120) ^j
Existing	75 (23)	100 (30)	50 (15)	50 (15)	150 (45)	400 (120) ^j
Business						
New	75 (23) ^k	100 (30) ^k	20 (6.1)	50 (15)	200 (60)	300 (91)
Existing	75 (23) ^k	100 (30) ^k	50 (15)	50 (15)	200 (60)	300 (91)
Industrial						
General	50 (15)	100 (30)	50 (15)	50 (15)	200 (60) ⁿ	250 (75) ^l
Special purpose	50 (15)	100 (30)	50 (15)	50 (15)	300 (91)	400 (122)
High hazard	0 (0)	0 (0)	0 (0)	0 (0)	75 (23)	75 (23)
Aircraft servicing hangars, ground floor	50 (15) ^m	50 (15) ^m	50 (15) ^m	50 (15) ^m	note n	note n
Aircraft servicing hangars, mezzanine floor	50 (15) ^m	50 (15) ^m	50 (15) ^m	50 (15) ^m	75 (23)	75 (23)
Storage						
Low hazard	NR	NR	NR	NR	NR	NR
Ordinary hazard	50 (15)	100 (30)	50 (15)	100 (30)	200 (60)	400 (122)
High hazard	0 (0)	0 (0)	0 (0)	0 (0)	75 (23)	75 (23)
Parking garages, open	50 (15)	50 (15)	50 (15)	50 (15)	300 (91)	400 (122)
Parking garages, enclosed	50 (15)	50 (15)	50 (15)	50 (15)	150 (45)	200 (60)
Aircraft storage hangars, ground floor	50 (15) ^m	100 (30) ^m	50 (15) ^m	50 (15) ^m	note n	note n
Aircraft servicing hangars, mezzanine floor	50 (15) ^m	75 (23) ^m	50 (15) ^m	50 (15) ^m	75 (23)	75 (23)

(Sheet 3 of 4)

Table A.7.6.1 Common Path, Dead-End, and Travel Distance Limits (by occupancy) (Continued)

Type of Occupancy	Common Path Limit		Dead-End Limit		Travel Distance Limit	
	Unsprinklered ft (m)	Sprinklered ft (m)	Unsprinklered ft (m)	Sprinklered ft (m)	Unsprinklered ft (m)	Sprinklered ft (m)
Storage (Continued)						
Underground spaces in grain elevators	50 (15) ^m	100 (30) ^m	50 (15) ^m	100 (30) ^m	200 (60)	400 (122)

(Sheet 4 of 4)

NA: Not applicable.

NR: No requirement.

^a20 ft (6.1 m) for common path serving >50 persons; 75 ft (23 m) for common path serving ≤50 persons.^bDead-end corridors not permitted; 20 ft (6.1 m) dead-end aisles permitted.^cSee Chapters 12 and 13 for special considerations for smoke-protected assembly seating in arenas and stadia.^dThis dimension is for the total travel distance, assuming incremental portions have fully utilized their permitted maximums. For travel distance within the room, and from the room exit access door to the exit, see the appropriate occupancy chapter.^eSee business occupancies Chapters 38 and 39.^fSee Chapter 23 for special considerations for existing common paths.^gThis dimension is from the room/corridor or suite/corridor exit access door to the exit; thus, it applies to corridor common path.^hSee appropriate occupancy chapter for special travel distance considerations for exterior ways of exit access.ⁱSee appropriate occupancy chapter for requirement for second exit access based on room area.^jSee Sections 36.4 and 37.4 for special travel distance considerations in covered malls considered pedestrian ways.^kSee Chapters 38 and 39 for special common path considerations for single tenant spaces.^lSee Chapter 40 for industrial occupancy special travel distance considerations.^mSee Chapters 40 and 42 for special requirements if high hazard.ⁿSee Chapters 40 and 42 for special requirements on spacing of doors in aircraft hangars.

A.7.6.2 The natural exit access (path of travel) will be influenced by the contents and occupancy of the building. Furniture, fixtures, machinery, or storage can serve to increase the length of travel. It is good practice in building design to recognize the influence of contents and occupancy by spacing exits for a completely open floor area at closer intervals than is required, thus reducing the hazard of excessive travel distances due to the introduction of furniture, fixtures, machinery, or storage and minimizing the possibility of violating the travel distance requirements of this *Code*.

A.7.6.3 Examples of locations where open stairways might exist include between mezzanines or balconies and the floor below.

A.7.7.1 An exit from the upper stories, in which the direction of egress travel is generally downward, should not be arranged so that it is necessary to change to travel in an upward direction at any point before discharging to the outside. A similar prohibition of reversal of the vertical component of travel should be applied to exits from stories below the floor of exit discharge. However, an exception is permitted in the case of stairs used in connection with overhead or underfloor exit passageways that serve the street floor only.

It is important that ample roadways be available from buildings in which there are large numbers of occupants so that exits will not be blocked by persons already outside. Two or more avenues of departure should be available for all but very small places. Location of a larger theater, for example, on a narrow dead-end street, might be prohibited by the authority having jurisdiction under this rule, unless some alternate way of travel to another street is available.

Exterior walking surfaces within the exit discharge are not required to be paved and often are provided by grass or similar

surfaces. Where discharging exits into yards, across lawns, or onto similar surfaces, in addition to providing the required width to allow all occupants safe access to a public way, such access also is required to meet the following:

- (1) The provisions of 7.1.7 with respect to changes in elevation
- (2) The provisions of 7.2.2 for stairs, as applicable
- (3) The provisions of 7.2.5 for ramps, as applicable
- (4) The provisions of 7.1.10 with respect to maintaining the means of egress free of obstructions that would prevent its use, such as snow and the need for its removal in some climates

A.7.8.1.1 Illumination provided outside the building should be to either a public way or a distance away from the building that is considered safe, whichever is closest to the building being evacuated.

A.7.8.1.3 A desirable form of means of egress lighting is by lights recessed in walls about 1 ft (30 cm) above the floor. Such lights are not likely to be obscured by smoke.

A.7.8.1.3 Exception No. 2 Some processes, such as manufacturing or handling of photosensitive materials, cannot be performed in areas provided with the minimum specified lighting levels. The use of spaces with lighting levels below 1 ft-candle (10 lux) might necessitate additional safety measures, such as written emergency plans, training of new employees in emergency evacuation procedures, and periodic fire drills.

A.7.8.1.4 An example of the failure of any single lighting unit is the burning out of an electric bulb.

A.7.8.2.1 An example of a power source with reasonably ensured reliability is a public utility electric service.

A.7.9.1.1 Emergency lighting provided outside the building should be to either a public way or a distance away from the building that is considered safe, whichever is closest to the building being evacuated.

A.7.9.2.1 The illumination uniformity ratio is determined by the following formula:

$$\frac{\text{Maximum illumination at any point}}{\text{Minimum illumination at any point}}$$

A.7.9.2.2 Where approved by the authority having jurisdiction, this requirement is permitted to be met by means such as the following.

(a) Two separate electric lighting systems with independent wiring, each adequate alone to provide the specified lighting. One such system is permitted to be supplied from an outside source such as a public utility service and the other from an electric generator on the premises driven by an independent source of power. Both sources of illumination should be in regular simultaneous operation whenever the building is occupied during periods of darkness.

(b) An electric circuit or circuits used only for means of egress illumination, with two independent electric sources arranged so that, on the failure of one, the other will automatically and immediately operate. One such source is permitted to be a connection from a public utility or similar outside power source and the other an approved storage battery with suitable provision to keep it automatically charged. Such a battery should be provided with automatic controls that, after operation of the battery due to failure of the primary power source or to turn-off the primary electric source for the lights, the battery will be shut off after its specified period of operation and will be automatically recharged and ready for further service when the primary current source is turned on again.

(c) Electric battery-operated emergency lighting systems complying with the provisions of 7.9.2.2 and operating on a separate circuit and at a voltage different from that of the primary light can be used where permitted. (See NFPA 70, *National Electrical Code*®.)

These requirements are not intended to prohibit the connection of a feeder serving exit lighting and similar emergency functions ahead of the service disconnect means, but such provision does not constitute an acceptable alternate source of power. Such a connection furnishes only supplementary protection for emergency electrical functions, particularly where intended to allow the fire department to open the main disconnect without hampering exit activities. Provision should be made to alert the fire department that certain power and lighting is fed by an emergency generator and will continue operation after the service disconnect is opened.

Where emergency lighting is provided by automatic transfer between normal power service and an emergency generator, it is the intent to prohibit the installation, for any reason, of a single switch that can interrupt both energy sources.

A.7.9.2.4 Automobile-type lead storage batteries are not suitable by reason of their relatively short life when not subject to frequent discharge and recharge as occurs in automobile operation.

For proper selection and maintenance of appropriate batteries, see NFPA 70, *National Electrical Code*.

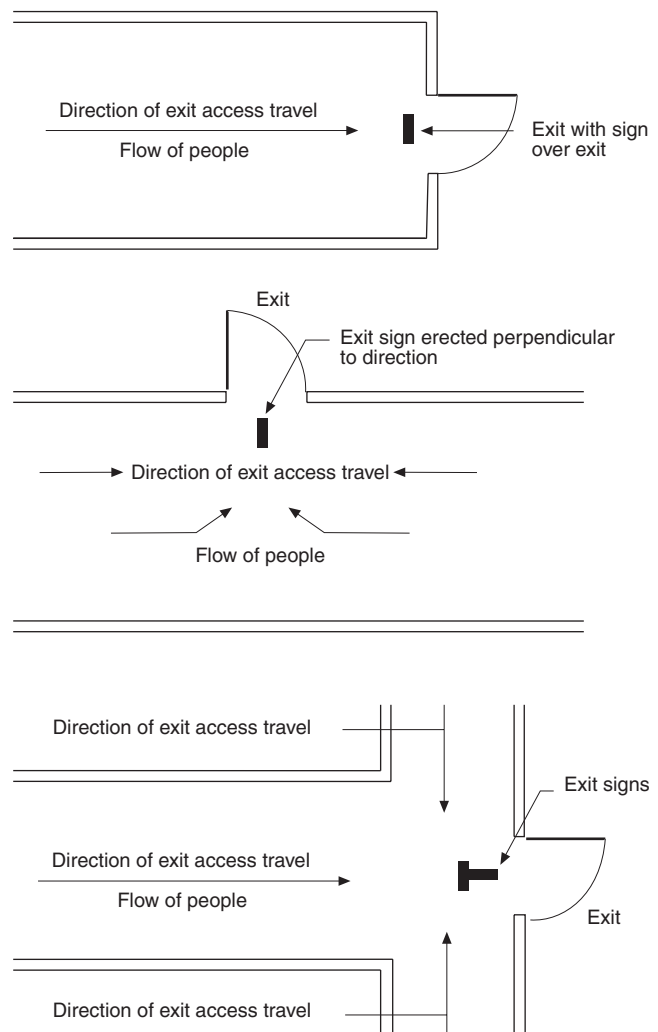
A.7.10.1.2 Where a main entrance serves also as an exit, it will usually be sufficiently obvious to occupants so that no exit sign is needed.

The character of the occupancy has a practical effect on the need for signs. In any assembly occupancy, hotel, department store, or other building subject to transient occupancy, the need for signs will be greater than in a building subject to permanent or semipermanent occupancy by the same people, such as an apartment house where the residents are presumed to be familiar with exit facilities by reason of regular use thereof. Even in a permanent residence-type building, however, there is need for signs to identify exit facilities such as outside stairs that are not subject to regular use during the normal occupancy of the building.

There are many types of situations where the actual need for signs is debatable. In cases of doubt, however, it is desirable to be on the safe side by providing signs, particularly as posting signs does not ordinarily involve any material expense or inconvenience.

The requirement for the locations of exit signs visible from any direction of exit access is illustrated in Figure A.7.10.1.2.

FIGURE A.7.10.1.2 Location of exit signs.



A.7.10.1.4 Based on 6-in. (15.2-cm) high letters, it is recognized that exit signs are legible at a distance of 100 ft (30 m). However, placing signs every 100 ft (30 m) in other than exit access corridors might create operating difficulties or encourage placement of a sign above the line of sight. To resolve the viewing distance versus placement issue, consideration should be given to increasing the size of the exit legend to the viewing distance proportionally if signs are placed at greater distances.

A.7.10.1.5 See A.7.10.3.

A.7.10.1.6 See 3.3.113 for definition of *internally illuminated*.

A.7.10.1.7 In stores, for example, an otherwise adequate exit sign could be rendered inconspicuous by a high-intensity illuminated advertising sign located in the immediate vicinity.

Red is the traditional color for exit signs and is required by law in many places. However, at an early stage in the development of the *Code*, a provision made green the color for exit signs, following the concept of traffic lights in which green indicates safety and red is the signal to stop. During the period when green signs were specified by the *Code*, many such signs were installed, but the traditional red signs also remained. In 1949, the Fire Marshals Association of North America voted to request that red be restored as the required exit sign color, as it was found that the provision for green involved difficulties in law enactment that were out of proportion to the importance of safety. Accordingly, the 10th edition of the *Code* specified red where not otherwise required by law. The present text avoids any specific requirement for color on the assumption that either red or green will be used in most cases and that there are some situations in which a color other than red or green could actually provide better visibility.

A.7.10.2 A sign complying with 7.10.2 indicating the direction of the nearest approved exit should be placed at the point of entrance to any escalator or moving walk. (See A.7.10.3.)

A.7.10.3 Where graphics are used, the symbols provided in NFPA 170, *Standard for Fire Safety Symbols*, should be used. Such signs need to provide equal visibility and illumination and are to comply with the other requirements of Section 7.10.

A.7.10.4 It is not the intent of this paragraph to require emergency lighting but only to have the sign illuminated by emergency lighting if emergency lighting is required and provided.

It is not the intent to require that the entire stroke width and entire stroke height of all letters comprising the word EXIT be visible per the requirements of 7.10.6.3 under normal or emergency lighting operation, provided that the sign is visible and legible at a 100-ft (30-m) distance under all room illumination conditions.

A.7.10.5.1 See A.7.8.1.3, Exception No. 2.

A.7.10.5.2 It is the intent to prohibit a freely accessible light switch to control the illumination of either an internally or externally illuminated exit sign.

A.7.10.5.2 Exception The flashing repetition rate should be approximately one cycle per second, and the duration of the off-time should not exceed $\frac{1}{4}$ second per cycle. During on-time, the illumination levels need to be provided in accordance with 7.10.6.3. Flashing signs, when activated with the fire alarm system, might be of assistance.

A.7.10.6.1 Experience has shown that the word EXIT or other appropriate wording is plainly legible at 100 ft (30 m) if the letters are as large as specified in 7.10.6.1.

A.7.10.6.2 Figure A.7.10.6.2 shows examples of acceptable locations of directional indicators with regard to left and right orientation. Directional indicators are permitted to be placed under the horizontal stroke of the letter T, provided that the spacing of not less than $\frac{3}{8}$ in. (1 cm) is maintained from the horizontal and vertical strokes of the letter T.

FIGURE A.7.10.6.2 Directional indicators.

EXIT >
<EXIT
<EXIT >

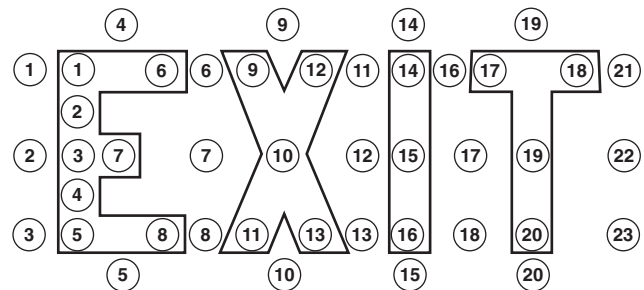
A.7.10.6.3 Colors providing a good contrast are red or green letters on matte white background. Glossy background and glossy letter colors should be avoided.

The average luminance of the letters and background is measured in footlamberts or candela per square meter. The contrast ratio is computed from these measurements by the following formula:

$$\text{Contrast} = \frac{L_g - L_e}{L_g}$$

Where L_g is the greater luminance and L_e is the lesser luminance, either the variable L_g or L_e is permitted to represent the letters, and the remaining variable will represent the background. The average luminance of the letters and background can be computed by measuring the luminance at the positions indicated in Figure A.7.10.6.3 by numbered spots.

FIGURE A.7.10.6.3 Measurement of exit sign luminance.



A.7.10.7.2 Photoluminescent signs need a specific minimum level of light on the face of the sign to ensure that the sign is charged for emergency operation and legibility in both the normal and emergency modes. Additionally, the type of light source (for example, incandescent, fluorescent, halogen, metal halide) is important. Each light source produces different types of visible and invisible light (for example, UV) that might affect the ability of some photoluminescent signs to charge and might also affect the amount of light output available during emergency mode. This type of sign would not be suitable where the illumination levels are permitted to decline. The charging light source should not be connected to automatic timers, because the continuous illumination of the sign is needed; otherwise, the sign illumination would not be available because it would be discharged.

A.7.10.8.1 The likelihood of occupants mistaking passageways or stairways that lead to dead-end spaces for exit doors

and becoming trapped governs the need for exit signs. Thus, such areas should be marked with a sign that reads as follows:

NO EXIT

Supplementary identification indicating the character of the area, such as TO BASEMENT, STOREROOM, LINEN CLOSET, or the like, is permitted to be provided. (See A.7.10.2.)

A.7.10.8.2(1) These signs are to be used in place of signs that indicate that elevators are not to be used during fires. Examples of these signs include the following:

In the event of fire, this elevator will be used by the fire department for evacuation of people.

PROTECTED ELEVATOR —
USABLE IN EMERGENCIES

A.7.10.8.2(2) The wording of these signs should reflect human behavior in fires and the control specifics of the elevator system. Subparagraph 7.10.8.2 addresses signs, but provisions for notification of the vision impaired need to be considered. For information about human behavior with respect to elevator evacuation see Groner and Levin, "Human Factors Considerations in the Potential for Using Elevators in Building Emergency Evacuation Plans"; Levin and Groner, "Human Behavior Aspects of Staging Areas for Fire Safety in

GSA Buildings"; and Levin and Groner, "Human Factors Considerations for the Potential Use of Elevators for Fire Evacuation of FAA Air Traffic Control Towers." Some examples of messages on signs that could be displayed are shown in Table A.7.10.8.2(2).

Table A.7.10.8.2(2) Elevator Status Messages

Elevator Status	Message
Normal use	Elevator in Service
Elevators recalled and waiting for fire service	Please Wait for Fire Department or Use Stairs
Elevator out of service	Elevator Out of Service

A.7.11.1 Seventy-five feet (23 m) can be traversed in approximately 10 seconds to 15 seconds, even when allowing for a momentary delay to decide which way to go, during which it can be assumed that the average individual can hold his or her breath.

CHAPTER 8

A.8.2.1 Table A.8.2.1 is Table 3-1 from NFPA 220, *Standard on Types of Building Construction*, and is reproduced in this annex for the convenience of users of this Code.

Table A.8.2.1 Fire Resistance Ratings (in hours) for Type I through Type V Construction

	Type I		Type II			Type III		Type IV	Type V	
	443	332	222	111	000	211	200	2HH	111	000
Exterior Bearing Walls –										
Supporting more than one floor, columns, or other bearing walls.....	4	3	2	1	0*	2	2	2	1	0*
Supporting one floor only.....	4	3	2	1	0*	2	2	2	1	0*
Supporting a roof only.....	4	3	1	1	0*	2	2	2	1	0*
Interior Bearing Walls –										
Supporting more than one floor, columns, or other bearing walls.....	4	3	2	1	0	1	0	2	1	0
Supporting one floor only.....	3	2	2	1	0	1	0	1	1	0
Supporting a roof only.....	3	2	1	1	0	1	0	1	1	0
Columns –										
Supporting more than one floor, columns, or other bearing walls.....	4	3	2	1	0	1	0	H	1	0
Supporting one floor only.....	3	2	2	1	0	1	0	H	1	0
Supporting a roof only.....	3	2	1	1	0	1	0	H	1	0
Beams, Girders, Trusses, and Arches –										
Supporting more than one floor, columns, or other bearing walls.....	4	3	2	1	0	1	0	H	1	0
Supporting one floor only.....	3	2	2	1	0	1	0	H	1	0
Supporting a roof only.....	3	2	1	1	0	1	0	H	1	0
Floor Construction	3	2	2	1	0	1	0	H	1	0
Roof Construction	2	1½	1	1	0	1	0	H	1	0
Exterior Nonbearing Walls	0*	0*	0*	0*	0*	0*	0*	0*	0*	0*

□ Represents those members that are permitted to be of approved combustible material.

H: Heavy timber members (see NFPA 220, *Standard on Types of Building Construction*, for requirements).

*Requirements for fire resistance of exterior walls, the provision of spandrel wall sections, and the limitation or protection of wall openings are not related to construction type. Such requirements need to be specified in other standards and codes, where appropriate, and might be required in addition to the requirements of NFPA 220, *Standard on Types of Building Construction*, for the construction type.

A.8.2.2.2 To ensure that a fire barrier is continuous, it is necessary to seal completely all openings where the fire barrier abuts other fire barriers, the exterior walls, the floor below, and the floor or ceiling above. In the exception to 8.2.2.2, the fire resistance rating of the bottom of the interstitial space is provided by that membrane alone. Ceilings of rated floor/ceiling and roof/ceiling assemblies do not necessarily provide the required fire resistance.

A.8.2.3.1.1 Exception No. 2 Methods for calculating the fire endurance of assemblies of the following materials are found in the publications referenced:

- (1) Concrete and masonry
 - a. ACI 2/6R, *Guide for Determining the Fire Endurance of Concrete Elements*
 - b. Concrete and Masonry Industry Firesafety Committee, *Analytical Methods of Determining Fire Endurance of Concrete and Masonry Members — Model Code Approved Procedures*
 - c. CRSI, *Reinforced Concrete Fire Resistance*
 - d. PCI, *Design for Fire Resistance of Precast Prestressed Concrete*
- (2) Steel
 - a. AISI, *Designing Fire Protection for Steel Columns*
 - b. AISI, *Designing Fire Protection for Steel Beams*
 - c. AISI, *Designing Fire Protection for Steel Trusses*
- (3) Wood
 - a. American Forest & Paper Association, *Design of Fire-Resistive Exposed Wood Members*
 - b. UBC, *Methods for Calculating Fire Resistance of Wood-Framed Walls, Floors and Roofs*

A.8.2.3.1.2(3) Walls in good condition with lath and plaster, or gypsum board of not less than $\frac{1}{2}$ -in. (1.3 cm), on each side can be considered as providing at least a $\frac{1}{2}$ -hour fire resistance rating. Additional information on archaic material assemblies can be found in Appendix D of NFPA 914, *Recommended Practice for Fire Protection in Historic Structures*.

A.8.2.3.2.1(a) Some doors have been tested to meet the conditions of acceptance of NFPA 251, *Standard Methods of Tests of Fire Endurance of Building Construction and Materials*. Where such assemblies are used, the provisions of 8.2.3.1 should be applied instead of those of 8.2.3.2.

A.8.2.3.2.2(1) Some window assemblies have been tested to meet the conditions of acceptance of NFPA 251, *Standard Methods of Tests of Fire Endurance of Building Construction and Materials*. Where such assemblies are used, the provisions of 8.2.3.1 should be applied instead of those of 8.2.3.2.

A.8.2.3.2.3 Longer ratings might be required where doors are provided for property protection as well as life safety.

NFPA 80, *Standard for Fire Doors and Fire Windows*, should be consulted for standard practice in the selection and installation of fire doors.

A.8.2.3.2.4.1 In engineered smoke management systems, the designer should consider the use of high-temperature links on fire dampers where air-handling ducts penetrate fire barriers.

A.8.2.3.2.4.2 Penetrations through fire barriers by cables, wires, pipes, tubes, conduits, vents, and other penetrating items, as well as insulation and coverings on penetrating items, should meet one of the following criteria:

- (1) They should be tested in accordance with NFPA 251, *Standard Methods of Tests of Fire Endurance of Building Construction and Materials*, as part of a rated assembly.
- (2) They should be protected by an approved through-penetration system that has been tested in accordance with ASTM E 814, *Methods for Fire Tests of Through-Penetration Fire Stops*.

In lieu of A.8.2.3.2.4.2(1) or (2), the annular space around the penetrating item is permitted to be protected where the penetrating item is a cable or wire without a combustible jacket or where it is a noncombustible cable, wire, pipe, tube, conduit, or vent. The material used to fill the annular space, that is, spaces between a sleeve and a penetrating item and between a sleeve and a fire barrier, should prevent the passage of flame and hot gases that are sufficient to ignite cotton waste when subjected to the time-temperature fire conditions of NFPA 251, *Standard Methods of Tests of Fire Endurance of Building Construction and Materials*. The test should be performed under a positive pressure differential of not less than 0.01 in. water column (2.5 Pa) at the location of the penetration for a time equivalent to the required fire resistance rating of the assembly penetrated. Where sleeves are used, the sleeves should be noncombustible and should be securely fastened to the fire barrier.

Concrete, mortar, or grout is permitted to be used to fill the annular spaces around iron, steel, or copper pipe, around tube or conduit, or around wires and cables with steel jackets that penetrate concrete or masonry fire barriers. The nominal diameter of the penetrating item should not exceed 6 in. (15.2 cm), and the opening size should not exceed 144 in.² (929 cm²). The thickness of concrete, mortar, or grout should be the full thickness of the barrier or the thickness necessary to provide a fire resistance rating not less than the required fire resistance rating of the barrier penetrated.

Openings for steel electrical outlet boxes not exceeding 16 in.² (103 cm²) that are not listed for use in fire resistance-rated assemblies should be permitted, provided that the area of such openings does not exceed 100 in.² (645 cm²) for any 100 ft² (9.3 m²) of enclosure wall area. Outlet boxes on opposite sides of the enclosure should be separated by a horizontal distance of not less than 24 in. (61 cm). Membrane penetrations for electrical outlet boxes of any material should be permitted, provided that such boxes are tested for use in fire-rated assemblies and installed in accordance with the tested assembly.

A.8.2.3.2.4.2(3) See NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, for additional information on air-handling ducts passing through fire barriers.

A.8.2.4.2 Exception An architectural, exposed, suspended-grid acoustical tile ceiling with penetrations for sprinklers, ducted HVAC supply and return air diffusers, speakers, and recessed light fixtures is capable of limiting the transfer of smoke.

A.8.2.4.3.4 Gasketing of doors should not be necessary, as the clearances in NFPA 80, *Standard for Fire Doors and Fire Windows*, effectively achieve resistance to the passage of smoke if the door is relatively tight-fitting.

A.8.2.4.4.3 An air transfer opening as defined in NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, is an opening designed to allow the movement of environmental air between two contiguous spaces.

A.8.2.5.2 Penetrations through floor/ceiling and roof/ceiling assemblies should be protected using the methods specified in Tables A.8.2.5.2(a) and (b).

Protection methods for penetrations are as follows:

- (a) *Method A.* 2-hour fire resistance-rated shaft enclosure
- (b) *Method B.* 1-hour fire resistance-rated shaft enclosure
- (c) *Method C.* Protection of the annular space around the penetrating item
 - C1 = Protection at the ceiling line
 - C2 = Protection at the floor line
- (d) *Method D.* Installation of an approved fire damper in a duct penetration in accordance with its listing
 - D1 = Ceiling damper at the ceiling line
 - D2 = Fire damper at the floor line
- (e) *Method E.* Use of an approved, through-penetration protection system tested in accordance with ASTM E 814, *Methods for Fire Tests of Through-Penetration Fire Stops*, at a positive pressure differential between the exposed and unexposed sur-

faces of the test assembly of not less than 0.01 in. water column (2.5 Pa)

Systems should have an F rating of not less than 1 hour but not less than the required fire resistance rating of the assembly being penetrated. Systems protecting floor penetrations should have a T rating of not less than 1 hour but not less than the required fire resistance rating of the floor being penetrated. Floor penetrations contained within the cavity of a wall at the location of the floor penetration do not require a T rating.

(f) *Method F.* No requirements

(g) *Method G.* Penetrations permitted only when tested in accordance with NFPA 251, *Standard Methods of Tests of Fire Endurance of Building Construction and Materials*, as a part of the rated assembly

Penetrations of nonrated assemblies should be protected as required by Table A.8.2.5.2(a). Penetrations of rated assemblies should be protected as required by Table A.8.2.5.2(b).

Table A.8.2.5.2(a) Nonrated Floor and Roof Assemblies

Penetration Location	Penetrating Material Classification						
	Conduits, Pipes, and Tubes [†]		Ducts		Factory-Built Appliance Vents and Chimneys		Cables and Wires
	NC	C	NC	C	NC	C	NC and C
Penetration through three floors or more (connecting four stories or more)	A, C2, or E	A or E	A				A or E
Penetration through two floors, maximum (connecting three stories, maximum)	A, B, C2, or E	A, B, or E	A or B	A or B	A, B, or C2	A or B	A, B, or E
Penetration through one floor, maximum (connecting two stories maximum)	A, B, C2, or E		A, B, C2, or D2		A, B, or C2		A, B, C2, or E
Penetration through roof/ceiling assembly	F						
Penetration through roof membrane only	F						

C: Combustible.

NC: Noncombustible.

[†]Pipes and tubes carrying hazardous materials might require additional protection.

Table A.8.2.5.2(b) Rated Floor and Roof Assemblies

Penetration Location		Penetrating Material Classification						
		Conduits, Pipes, and Tubes [†]		Ducts		Factory-Built Appliance Vents and Chimneys		Cables and Wires
		NC	C	NC	C	NC	C	NC and C
Penetration through three floors or more (connecting four stories or more)		A, E, or G	A or E	A				A or E
Penetration through two floors, maximum (connecting three stories, maximum)		A, B, C2, E, or G	A, B, E, or G	A or B		A or B		A, B, E, or G
Penetration through one floor, maximum (connecting two stories, maximum)	Monolithic fire-rated assembly	A, B, C2, E, or G	A, B, E, or G	A, B, or D2 [‡]		A, B, or C2	A or B	A, B, C2, E, or G
	Fire-rated assembly with membrane protection	Ceiling membrane penetrated		A, B, D1 [§] , or G		A, B, or C1 [§]		A, B, C1 [§] , E, or G
				Floor membrane penetrated	A, B, or D2 [‡]			A, B, or C2
Penetration through roof/ceiling assembly	Ceiling membrane	A, B, C1 [§] , E, or G			A, B, D1 [§] , or G			A, B, or C1 [§]
Penetration through roof membrane only		Roof membrane	F					

C: Combustible.

NC: Noncombustible.

[†]Pipes and tubes carrying hazardous materials might require additional protection.

[‡]Duct is required to be part of fully ducted system (transfer grilles not permitted).

[§]Aggregate area of openings not to exceed 100 in.² (0.065 m²)/100 ft² (9.3 m²).

Expansion joints are usually found only in large buildings (that is, not less than 200 ft (60 m) in either length or width, or both) of steel or concrete construction. They are provided to allow the separate portions of the structural frame to expand and contract with temperature and moisture changes without adversely affecting the building's structural integrity or serviceability. Expansion joints can usually be identified by the following characteristics:

- (1) A double row of columns
- (2) A width of 1 in. to 3 in. (2.5 cm to 7.6 cm)
- (3) A steel plate cover that is attached to the floor on one side of the joint and is free to slide on the other side

Expansion joints should not be confused with control or construction joints.

Control joints are normally found in concrete or masonry walls and concrete slabs-on-grade. They are provided for the following purposes:

- (1) To prevent cracking of the wall or slab due to excessive tensile forces in the concrete or masonry caused by shrinkage upon drying

- (2) To induce cracking due to excessive tensile forces caused by drying or shrinkage expected to occur at a predetermined location; hence, the term *control joint*

Construction joints are used as stopping and starting points for two successive concrete placements (pours) in walls, floors, and beams. Since a construction joint is required to be designed to transfer load across the joints, separation due to thermal- or moisture-induced movements is not anticipated.

Seismic joints might be found in buildings other than those that are rectangular in plan (for example, L- and T-shaped buildings) in areas where the risk of an earthquake is moderate to high. Such joints in multistory buildings can be as much as 12 in. (30.5 cm) in width. They are provided to allow the separated portions of the building to act independently of each other to undergo differential lateral displacements when an earthquake occurs.

With expansion or seismic joints, consideration should be given to the ability of the protecting system to remain in place and perform its intended function after repeated movements of the joint, and with the width of the joint varying from its maximum to minimum width. In the case of seismic joints, the protection system can be damaged during an earthquake that

otherwise is not strong enough to cause major structural damage to the building. Therefore, it is necessary to conduct an inspection of such buildings after an earthquake.

A.8.2.5.2 Exception No. 3 One method of determining the fire resistance rating of expansion and seismic joints is by testing in accordance with UL 2079, *Test for Fire Resistance of Building Joint Systems*.

A.8.2.5.4 The application of the 2-hour rule in buildings not divided into stories is permitted to be based on the number of levels of platforms or walkways served by the stairs.

A.8.2.5.5(7) Given that a mezzanine meeting the maximum one-third area criterion of 8.2.6.2.1 is not considered a story, it is permitted, therefore, to have 100 percent of its exit access within the communicating area run back through the story below.

A.8.2.5.6 Where atriums are used, there is an added degree of safety to occupants because of the large volume of space into which smoke can be dissipated. However, there is a need to ensure that dangerous concentrations of smoke are promptly removed from the atrium, and the exhaust system needs careful design. For information about systems that can be used to provide smoke protection in these spaces, see the following:

- (1) NFPA 92B, *Guide for Smoke Management Systems in Malls, Atria, and Large Areas*
- (2) *Design of Smoke Management Systems*

A.8.2.5.6(1) Exception No. 2 The intent of the requirement for closely spaced sprinklers to wet the atrium glass wall is to ensure that the surface of the glass is wet upon operation of the sprinklers, with a maximum spacing of sprinklers of 6 ft (1.8 m) on centers. Provided that it can be shown that the glass can be wet by the sprinklers using a given discharge rate and that the 8-ft (1.8-m) spacing is not exceeded, the intent of the requirement is met.

A.8.2.5.6(5) See NFPA 92B, *Guide for Smoke Management Systems in Malls, Atria, and Large Areas*.

The engineering analysis should include the following elements:

- (1) Fire dynamics, including fire size and location, materials likely to be burning, fire plume geometry, fire plume or smoke layer impact on means of egress, and tenability conditions during the period of occupant egress
- (2) Response and performance of building systems, including passive barriers, automatic detection and extinguishing, and smoke control
- (3) Response time required for building occupants to reach building exits, including any time required to exit through the atrium as permitted by 8.2.5.6(2)

A.8.2.5.6(6) Activation of the ventilation system by manual fire alarms, extinguishing systems, and detection systems can cause unwanted operation of the system, and it is suggested that consideration be given to zoning of the activation functions so the ventilation system operates only when actually needed.

A.8.2.5.8(4) This requirement prohibits means of egress down or up the convenience opening. It does not prohibit means of escape from running down or up the convenience opening within residential dwelling units.

A.8.2.5.12 Exception No. 1 The intent of the exception is to place a limitation on the size of the opening to which the pro-

tection applies. The total floor opening should not exceed twice the projected area of the escalator or moving walk at the floor. Also, the arrangement of the opening is not intended to circumvent the requirements of 8.2.5.6.

As with any opening through a floor, the openings around the outer perimeter of the escalators should be considered as vertical openings. The sprinkler draftstop installation is intended to provide adequate protection for these openings, provided that the criteria of NFPA 13, *Standard for the Installation of Sprinkler Systems*, as well as the area criteria described in the preceding paragraph, are met.

A.8.2.7.1 The area limitations are based on life safety considerations and are not intended to suggest that changes should be made in local building codes having similar or more restrictive requirements that are based on other reasons. Building codes generally contain detailed information on the proper selection and installation of draftstopping and firestopping materials.

A.8.3.1 Wherever smoke barriers and doors therein require a degree of fire resistance as specified by requirements in the various occupancy chapters (Chapter 12 through Chapter 42), the construction should be a fire barrier that has been specified to limit the spread of fire and restrict the movement of smoke. (See 8.2.3.2.)

A.8.3.2 To ensure that a smoke barrier is continuous, it is necessary to seal completely all openings where the smoke barrier abuts other smoke barriers, fire barriers, exterior walls, the floor below, and the floor or ceiling above.

It is not the intent to prohibit a smoke barrier from stopping at a fire barrier if the fire barrier meets the requirements of a smoke barrier (that is, the fire barrier is a combination smoke barrier/fire barrier).

A.8.3.4.1 The clearance for proper operation of smoke doors is defined as $1/8$ in. (0.3 cm). For additional information on the installation of smoke-control door assemblies, see NFPA 105, *Recommended Practice for the Installation of Smoke-Control Door Assemblies*.

A.8.3.4.2 In existing installations only, a $1\frac{3}{4}$ -in. (4.4-cm) thick, solid-bonded wood core door has been considered a satisfactory substitute for a door with a 20-minute fire protection rating.

A.8.3.4.3 Where, because of operational necessity, it is desired to have smoke barrier doors that are usually open, such doors should be provided with hold-open devices that are activated to close the doors by means of the operation of smoke detectors and other alarm functions.

A.8.4.1.1 Areas requiring special hazard protection include, but are not limited to, areas such as those used for storage of combustibles or flammables, areas housing heat-producing appliances, or areas used for maintenance purposes.

A.8.4.2 For details, see NFPA 68, *Guide for Venting of Deflagrations*.

A.8.4.3.2 NFPA 58, *Liquefied Petroleum Gas Code*, permits portable butane-fueled appliances in restaurants and in attended commercial food catering operations where fueled by not in excess of two 10-oz (0.28-kg) LP-Gas capacity, nonrefillable butane containers having a water capacity not in excess of 1.08 lb (0.4 kg) per container. Containers are required to be directly connected to the appliance, and manifolded containers is not permitted. Storage of cylinders is also limited to 24 containers, with an

additional 24 permitted where protected by a 2-hour fire resistance-rated barrier.

A.8.4.5 While the scope of NFPA 99, *Standard for Health Care Facilities*, is limited to health care occupancies, it is the intent that this requirement be applied to hyperbaric facilities used in all occupancies.

CHAPTER 9

A.9.3.1 For guidance on designing, installing, acceptance testing, periodic testing, and maintaining engineered smoke-control systems, see the following (*see A.23.3.1.3 for existing detention and correctional occupancies*):

- (1) NFPA 92A, *Recommended Practice for Smoke-Control Systems*
- (2) NFPA 92B, *Guide for Smoke Management Systems in Malls, Atria, and Large Areas*
- (3) NFPA SPP-53, *Smoke Control in Fire Safety Design*
- (4) *Design of Smoke Management Systems*
- (5) ASHRAE *Guideline 5: Guideline for Commissioning Smoke Management Systems*

A.9.4.1 Under certain conditions, elevators are recognized as means of egress.

The use of elevators for emergency evacuation purposes where operated by trained emergency service personnel (for example, building personnel, fire personnel) should be utilized in the building evacuation program. Elevators are normally capable of manual, in-car fire fighter operation (Phase II) after elevator recall (Phase I). In addition, there usually are two or more shafts wherever there are more than three elevators, which further enhances the possibilities for elevator use during a fire emergency where operated by trained personnel.

In high-rise buildings, in towers, or in deep underground spaces where travel over considerable vertical distance on stairs can cause persons incapable of such physical effort to collapse before they reach the street exit, stairways are permitted to be used for initial escape from the immediate area of danger, and elevators are permitted to be used to complete the travel to the street.

It can be reasonably assumed that in all buildings of sufficient height to indicate the need for elevators, elevators will be provided for normal use; for this reason, no requirements for mandatory installation of elevators are included in the *Code*.

For additional information on elevators, see ASME/ANSI A17.1, *Safety Code for Elevators and Escalators*, and ASME/ANSI A17.3, *Safety Code for Existing Elevators and Escalators*.

A.9.4.5 Continued operation of solid-state elevator equipment is contingent on maintaining the ambient temperature in the range specified by the elevator manufacturer. If the machine room ventilation/air conditioning is connected to the general building system, and that system is shut down during a fire, the fire department might lose the use of elevators due to excessive heat in the elevator machine room.

A.9.6.1.3 Some of the provisions of Section 9.6 originated with NFPA 72, *National Fire Alarm Code*[®]. For purposes of this *Code*, some provisions of Section 9.6 are more stringent than those of NFPA 72, which should be consulted for additional details.

A.9.6.1.7 Records of conducted maintenance and testing and a copy of the certificate of compliance should be maintained.

A.9.6.1.8 A fire watch should at least involve some special action beyond normal staffing, such as assigning an additional security guard(s) to walk the areas affected. These individuals

should be specially trained in fire prevention and in occupant and fire department notification techniques, and they should understand the particular fire safety situation for public education purposes. (*Also see NFPA 601, Standard for Security Services in Fire Loss Prevention.*)

A.9.6.2.4 It is not the intent of 9.6.2.4 to require manual fire alarm boxes to be attached to movable partitions or to equipment, nor is it the intent to require the installation of permanent structures for mounting purposes only.

A.9.6.2.6 Manual fire alarm boxes can include those with key-operated locks for detention areas or psychiatric hospitals, manual fire alarm boxes in areas where explosive vapors or dusts might be a hazard, or manual fire alarm boxes in areas with corrosive atmospheres. The appearance of manual fire alarm boxes for special uses often differs from those used in areas of normal occupancy. Manual fire alarm boxes, such as those with locks, that are located in areas where the general public has limited access might need to have signage advising persons to seek assistance from staff in the event a fire is noted.

A.9.6.2.10.3 A living unit is that structure, area, room, or combination of rooms, including hotel rooms/suites, in which a family or individual lives. A living unit includes living areas only and not common usage areas in multifamily buildings such as corridors, lobbies, and basements.

A.9.6.3.2 Exception No. 1 Elevator lobbies have been considered areas subject to unwanted alarms due to factors such as low ceilings and smoking. In the past several years, new features have become available to reduce this problem. These features are, however, not necessarily included in any specific installation.

A.9.6.3.2 Exception Nos. 2 and 3 The concept addressed by the exceptions is that detectors used for releasing service, such as door or damper closing and fan shutdown, are not required to sound the building alarm.

A.9.6.3.5 Effective July 1, 1996, NFPA 72, *National Fire Alarm Code*, requires the use of the standard fire alarm evacuation signal for new alarm system installations in all buildings where the fire plan requires evacuation.

A.9.6.3.7 Exception No. 1 In order to approve an evacuation plan to selectively notify building occupants, the authority having jurisdiction should consider several building parameters, including building compartmentation, detection and suppression system zones, occupant loads, and the number and arrangement of the means of egress.

In high-rise buildings, it is typical to evacuate the fire floor, the floor(s) above, and the floor immediately below. Other areas are then evacuated as the fire develops.

A.9.6.5.4 Control devices (fire alarm relays) can be located at a motor control center that is located floors away from the device to be activated, such as air-handling units and exhaust fans located on the roof. The requirement for monitoring for integrity only applies to the installation wiring between the fire alarm control unit and the auxiliary fire alarm relay. It does not apply to the wiring between the auxiliary fire alarm relay and the emergency control device (for example, motor stop/start control relay) or between the emergency control device and the equipment to be controlled (for example, air-handling units and exhaust fans). For example, although the auxiliary fire alarm relay is required be located within 3 ft (0.9 m) of the emergency control device, there is no limit specified for the distance

between the emergency control device and the equipment to be controlled.

A.9.7.1.1 For a discussion of the effectiveness of automatic sprinklers as well as a general discussion on automatic sprinklers, see the NFPA *Fire Protection Handbook*. Where partial sprinkler protection is permitted by another section of this *Code*, the limited area systems provisions of NFPA 13, *Standard for the Installation of Sprinkler Systems*, should apply.

A.9.7.1.3 Properly designed automatic sprinkler systems provide the dual function of both automatic alarms and automatic extinguishment. Dual function is not provided in those cases where early detection of incipient fire and early notification of occupants are needed to initiate actions in behalf of life safety earlier than can be expected from heat-sensitive fire detectors.

A.9.7.2.1 NFPA 72, *National Fire Alarm Code*, provides details of standard practice in sprinkler supervision. Subject to the approval of the authority having jurisdiction, sprinkler supervision is also permitted to be provided by direct connection to municipal fire departments or, in the case of very large establishments, to a private headquarters providing similar functions. NFPA 72, *National Fire Alarm Code*, covers such matters.

Where municipal fire alarm systems are involved, reference should also be made to NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*.

A.9.7.3 Automatic extinguishing systems, other than automatic sprinklers, are covered by the following NFPA standards:

- (1) NFPA 11, *Standard for Low-Expansion Foam*
- (2) NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems*
- (3) NFPA 12A, *Standard on Halon 1301 Fire Extinguishing Systems*
- (4) NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*

- (5) NFPA 17, *Standard for Dry Chemical Extinguishing Systems*
- (6) NFPA 2001, *Standard on Clean Agent Fire Extinguishing Systems*

A.9.7.4.1 For a description of standard types of extinguishers and their installation, maintenance, and use, see NFPA 10, *Standard for Portable Fire Extinguishers*. The labels of recognized testing laboratories on extinguishers provide evidence of tests indicating the reliability and suitability of the extinguisher for its intended use. Many unlabeled extinguishers are offered for sale that are substandard by reason of insufficient extinguishing capacity, questionable reliability, or ineffective extinguishing agents for fires in ordinary combustible materials or because they pose a personal hazard to the user.

A.9.7.6 A fire watch should at least involve some special action beyond normal staffing, such as assigning an additional security guard(s) to walk the areas affected. These individuals should be specially trained in fire prevention and in the use of fire extinguishers and occupant hose lines, in notifying the fire department, in sounding the building fire alarm, and in understanding the particular fire safety situation for public education purposes. Some authorities having jurisdiction require fire fighters to be assigned to the area, with direct radio communication to the local fire department. (*Also see NFPA 601, Standard for Security Services in Fire Loss Prevention.*)

CHAPTER 10

A.10.2 The requirements pertaining to interior finish are intended to restrict the spread of fire over the continuous surface forming the interior portions of a building.

A.10.2.2 Table A.10.2.2 provides a compilation of the interior finish requirements of the occupancy chapters (Chapter 12 through Chapter 42) of this *Code*.

Table A.10.2.2 Interior Finish Classification Limitations

Occupancy	Exits	Access to Exits	Other Spaces
Assembly — New			
>300 occupant load	A	A or B	A or B
≤300 occupant load	A	A or B	A, B, or C
Assembly — Existing			
>300 occupant load	A	A or B	A or B
≤300 occupant load	A	A or B	A, B, or C
Educational — New	A	A or B	A or B, C on low partitions [†]
Educational — Existing	A	A or B	A, B, or C
Day-Care Centers — New	A I or II	A I or II	A or B NR
Day-Care Centers — Existing	A or B	A or B	A or B
Group Day-Care Homes — New	A or B	A or B	A, B, or C
Group Day-Care Homes — Existing	A or B	A, B, or C	A, B, or C
Family Day-Care Homes	A or B	A, B, or C	A, B, or C

Table A.10.2.2 Interior Finish Classification Limitations (Continued)

Occupancy	Exits	Access to Exits	Other Spaces
Health Care — New (sprinklers mandatory)	A or B	A or B C on lower portion of cor- ridor wall†	A or B C in small individual rooms†
Health Care — Existing	A or B	A or B	A or B
Detention and Correc- tional — New	A† I	A† I	A, B, or C
Detention and Correc- tional — Existing	A or B† I or II	A or B† I or II	A, B, or C
1- and 2-Family Dwellings, Lodging or Rooming Houses	A, B, or C	A, B, or C	A, B, or C
Hotels and Dormitories — New	A I or II	A or B I or II	A, B, or C
Hotels and Dormitories — Existing	A or B I or II†	A or B I or II†	A, B, or C
Apartment Buildings — New	A I or II†	A or B I or II†	A, B, or C
Apartment Buildings — Existing	A or B I or II†	A or B I or II†	A, B, or C
Residential, Board and Care — (See Chapters 32 and 33.)			
Mercantile — New	A or B	A or B	A or B
Mercantile — Existing Class A or Class B	A or B	A or B	Ceilings — A or B, walls — A, B, or C
Mercantile — Existing Class C	A, B, or C	A, B, or C	A, B, or C
Business and Ambulatory Health Care — New	A or B I or II	A or B I or II	A, B, or C
Business and Ambulatory Health Care — Existing	A or B	A or B	A, B, or C
Industrial	A or B	A, B, or C	A, B, or C
Storage	A or B	A, B, or C	A, B, or C

NR: No requirement.

Notes:

1. Class A interior wall and ceiling finish — flame spread 0–25, (new) smoke developed 0–450.
2. Class B interior wall and ceiling finish — flame spread 26–75, (new) smoke developed 0–450.
3. Class C interior wall and ceiling finish — flame spread 76–200, (new) smoke developed 0–450.
4. Class I interior floor finish — critical radiant flux, not less than 0.45 W/cm².
5. Class II interior floor finish — critical radiant flux, not less than 0.22 W/cm² but less than 0.45 W/cm².
6. Automatic sprinklers — where a complete standard system of automatic sprinklers is installed, interior wall and ceiling finish with flame spread rating not exceeding Class C is permitted to be used in any location where Class B is required and with rating of Class B in any location where Class A is required; similarly, Class II interior floor finish is permitted to be used in any location where Class I is required, and no critical radiant flux rating is required where Class II is required. These provisions do not apply to new health care facilities.
7. Exposed portions of structural members complying with the requirements for heavy timber construction are permitted.

†See corresponding chapters for details.

A.10.2.2.2 This paragraph recognizes that traditional finish floors and floor coverings such as wood flooring and resilient floor coverings have not proved to present an unusual hazard.

A.10.2.3.1 See A.10.2.4.1.5.

A.10.2.3.2 It has been shown that the method of mounting interior finish materials may affect actual performance. Where materials are tested in intimate contact with a substrate to determine a classification, such materials should be installed in intimate contact with a similar substrate. Such details are especially important for “thermally thin” materials. For further information, see NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials*.

Some interior wall and ceiling finish materials, such as fabrics not applied to a solid backing, do not lend themselves to a test made in accordance with NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials*. In these cases, the large-scale test outlined in NFPA 701, *Standard Methods of Fire Tests for Flame Propagation of Textiles and Films*, is permitted to be used.

Prior to 1978, the test report described by NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials*, included an evaluation of the fuel contribution as well as the flame spread rating and the smoke development value. However, it is now recognized that the measurement on which the fuel contribution is based does not provide a valid measure. Therefore, although the data are recorded during the test, the information is no longer normally reported. Classification of interior wall and ceiling finish thus relies only on flame spread index and smoke development value.

The 450 smoke development value limit is based solely on obscuration. (See A.10.2.4.1.5.)

A.10.2.3.5.1 The methodology specified in NFPA 265, *Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Wall Coverings*, includes provisions for measuring smoke obscuration. Such measurement is considered desirable but the basis for specific recommended values is not currently available. (See A.10.2.4.1.5.)

A.10.2.3.5.2 See A.10.2.3.5.1 and A.10.2.4.1.5.

A.10.2.4.1.5 Previous editions of the *Code* have regulated textile materials on walls and ceilings using NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials*. Full-scale room/corner fire test research has shown that flame spread indices produced by NFPA 255 might not reliably predict all aspects of the fire behavior of textile wall and ceiling coverings.

Testing by NFPA 265, *Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Wall Coverings*, uses a reasonably sized ignition source to show that the material will not spread fire to involve objects remote from the area of origin and that the textile product will not generate sufficient energy to cause the room of origin to reach flashover. Acceptance of textile wall covering materials should be contingent on qualification tests in which a specific textile/adhesive pair has been evaluated.

Although NFPA 265, *Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Wall Coverings*, was developed for assessing the performance of textile wall coverings, the method can be, and has been, used to evaluate other types of wall finish. As long as a wall finish is tested using a mounting system, substrate, and adhesive (if appropriate) that are representative of actual use, NFPA 265 provides an evaluation of a product’s flammability and smoke obscuration behav-

ior. Moreover, NFPA 286, *Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth*, has now been developed to evaluate other interior finish materials. Manufacturers, installers, and specifiers should be encouraged to use NFPA 265 or NFPA 286, as appropriate, — but not both — because each of these standard fire tests has the ability to characterize actual product behavior, as opposed to data generated by tests using NFPA 255, which only allows comparisons of one product’s performance with another. If a manufacturer or installer chooses to test a wall finish in accordance with NFPA 265 or NFPA 286, as appropriate, additional testing in accordance with NFPA 255 is not necessary.

The initial edition of NFPA 265 did not contain smoke obscuration measurements, and previous editions of the *Code* have not included smoke obscuration requirements based on NFPA 265 tests. The 1998 edition of NFPA 265 does include smoke obscuration measurements.

The test results from NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials*, are suitable for classification purposes but should not be used as input into fire models, because they are not generated in units suitable for engineering calculations. Actual test results, for heat, smoke, and combustion product release from NFPA 265, *Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Wall Coverings*, might be suitable for use as input into fire models for performance-based design.

A.10.2.4.2 Expanded vinyl wall covering consists of a woven textile backing, an expanded vinyl base coat layer, and a non-expanded vinyl skin coat. The expanded base coat layer is a homogeneous vinyl layer that contains a blowing agent. During processing, the blowing agent decomposes, which causes this layer to expand by forming closed cells. The total thickness of the wall covering is approximately 0.055 in. to 0.070 in. (0.14 cm to 0.18 cm).

A.10.2.4.4 Light-transmitting plastics are used for a variety of purposes, including light diffusers, exterior wall panels, skylights, canopies, glazing, and the like. Previous editions of the *Code* have not addressed the use of light-transmitting plastics. Light-transmitting plastics will not normally be used in applications representative of interior finishes. Accordingly, NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials*, can produce test results that might or might not apply.

Light-transmitting plastics are regulated by the United States model building codes; see, for example, the *Uniform Building Code*, the *Standard Building Code*, and the *National Building Code*. Model building codes provide adequate regulation for most applications of light-transmitting plastics. Where an authority having jurisdiction determines that a use is contemplated that differs from uses regulated by model building codes, light-transmitting plastics in such applications can be substantiated by fire tests that demonstrate the combustibility characteristics of the light-transmitting plastics for the use intended under actual fire conditions.

A.10.2.6 Fire-retardant coatings need to be applied to surfaces properly prepared for the material, and application needs to be consistent with the product listing. Deterioration of coatings applied to interior finishes can occur due to repeated cleaning of the surface or painting over applied coatings.

A.10.2.7.1 The flooring radiant panel provides a measure of a floor covering’s tendency to spread flames where located in a

corridor and exposed to the flame and hot gases from a room fire. The flooring radiant panel test method is to be used as a basis for estimating the fire performance of a floor covering installed in the building corridor. Floor coverings in open building spaces and in rooms within buildings merit no further regulation, provided that it can be shown that the floor covering is at least as resistant to spread of flame as a material that meets the U.S. federal flammability standard 16 *CFR* 1630, *Standard for the Surface Flammability of Carpets and Rugs (FF 1-70)*. All carpeting sold in the U.S. since 1971 is required to meet this standard and, therefore, is not likely to become involved in a fire until a room reaches or approaches flashover. Therefore, no further regulations are necessary for carpet other than carpet in exitways and corridors.

It has not been found necessary or practical to regulate interior floor finishes on the basis of smoke development.

A.10.3.1 Testing per NFPA 701, *Standard Methods of Fire Tests for Flame Propagation of Textiles and Films*, applies to textiles and films used in a hanging configuration. If the textiles and films are to be applied to surfaces of buildings or backing materials as interior finishes for use in buildings, they should be treated as interior wall and ceiling finishes in accordance with Section 10.2 of this *Code*, and they should then be tested for flame spread rating and smoke development values in accordance with NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials*, or for flame spread and flashover in accordance with NFPA 265, *Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Wall Coverings*.

The test results from NFPA 701 are suitable for classification purposes but should not be used as input into fire models, because they are not generated in units suitable for engineering calculations.

A.10.3.2 The Class I requirement associated with testing per NFPA 260, *Standard Methods of Tests and Classification System for Cigarette Ignition Resistance of Components of Upholstered Furniture*; the char length of not more than 1.5 in. (3.8 cm) required with testing per NFPA 261, *Standard Method of Test for Determining Resistance of Mock-Up Upholstered Furniture Material Assemblies to Ignition by Smoldering Cigarettes*; and the char length of not more than 2 in. (5.1 cm) required in FF4-72, *Standard for the Flammability of Mattresses*, are indicators that the furniture item or mattress is resistant to a cigarette ignition. Although rooms or spaces protected by an approved automatic sprinkler system are exempt from cigarette ignition resistance testing, a fire that smolders for an excessive period of time without flaming can reduce the tenability within the room or area of fire origin without developing the temperatures necessary to operate automatic sprinklers.

The test results from NFPA 260 and NFPA 261 are suitable for classification purposes but should not be used as input into fire models, because they are not generated in units suitable for engineering calculations.

A.10.3.2(3) Regardless of sprinkler protection provided, U.S. federal regulations require mattresses in the United States to comply with 16 *CFR* 1632.

A.10.3.3 The intent of the provisions of 10.3.3 is as follows.

(a) The peak heat release rate of not more than 250 kW by a single upholstered furniture item was chosen based on maintaining a tenable environment within the room of fire origin. The sprinkler exception was developed because the sprinkler system helps to maintain tenable conditions even if the single

upholstered furniture item were to have a peak rate of heat release in excess of 250 kW.

(b) The total energy release of not more than 40 MJ by the single upholstered furniture item during the first 5 minutes of the test was established as an additional safeguard to protect against the adverse conditions that would be created by an upholstered furniture item that released its heat in other than the usual measured scenario. During the test for measurement of rate of heat release, the instantaneous heat release value usually peaks quickly and then quickly falls off so as to create a triangle-shaped curve. In the atypical case, if the heat release were to peak and remain steady at that elevated level, as opposed to quickly falling off, the 250-kW limit would not ensure safety. Again, only a sprinkler exception is permitted in lieu of the test because of the ability of the sprinkler system to control the fire.

Actual test results for heat, smoke, and combustion product release from NFPA 266, *Standard Method of Test for Fire Characteristics of Upholstered Furniture Exposed to Flaming Ignition Source*, and ASTM E 1537, *Standard Method of Fire Testing of Real Scale Upholstered Furniture Items*, might be suitable for use as input into fire models for performance-based design.

A.10.3.4 The intent of the provisions of 10.3.4 4 is as follows.

(a) The peak heat release rate of not more than 250 kW by a single mattress was chosen based on maintaining a tenable environment within the room of fire origin. The sprinkler exception was developed because the sprinkler system helps to maintain tenable conditions even if the single mattress were to have a peak rate of heat release in excess of 250 kW.

(b) The total energy release of not more than 40 MJ by the single mattress during the first 5 minutes of the test was established as an additional safeguard to protect against the adverse conditions that would be created by a mattress that released its heat in other than the usual measured scenario. During the test for measurement of rate of heat release, the instantaneous heat release value usually peaks quickly and then quickly falls off so as to create a triangle-shaped curve. In the atypical case, if the heat release were to peak and remain steady at that elevated level, as opposed to quickly falling off, the 250-kW limit would not ensure safety. Again, only a sprinkler exception is permitted in lieu of the test because of the ability of the sprinkler system to control the fire.

Actual test results for heat, smoke, and combustion product release from NFPA 267, *Standard Method of Test for Fire Characteristics of Mattresses and Bedding Assemblies Exposed to Flaming Ignition Source*, and ASTM E 1590, *Standard Method for Fire Testing of Real Scale Mattresses*, might be suitable for use as input into fire models for performance-based design.

A.10.3.5 Christmas trees not effectively flame-retardant treated, ordinary crepe paper decorations, and pyroxylin plastic decorations might be classified as highly flammable.

A.10.3.7 UL 1975, *Standard for Fire Tests for Foamed Plastics Used for Decorative Purposes*, is not intended for evaluating interior wall and ceiling finish materials.

Actual test results for heat, smoke, and combustion product release from UL 1975 might be suitable for use as input into fire models intended for performance-based design.

CHAPTER 11

A.11.2.2 Escape chutes, controlled descent devices, and elevators permitted to provide escape routes in special structures; however, they should not be substituted for the provisions of this *Code*.

A.11.3.2.4 The Washington Monument in Washington, DC, is an example of a tower where it would be impracticable to provide a second stairway.

A.11.5 For further information on pier fire protection, see NFPA 307, *Standard for the Construction and Fire Protection of Marine Terminals, Piers, and Wharves*.

A.11.6 Fire safety information for manufactured home parks is found in NFPA 501A, *Standard for Fire Safety Criteria for Manufactured Home Installations, Sites, and Communities*.

A.11.7.2 It is not the intent that emergency access openings be readily openable from the exterior by the public but that they can easily be opened with normal fire department equipment.

A.11.8.2.1 Where an occupancy chapter (Chapter 12 through Chapter 42) permits the omission of sprinklers in specific spaces, such as small bathrooms and closets in residential occupancies, the building is still considered to be protected throughout for the purposes of 11.8.2.1.

A.11.8.3.1 The need for voice communication can be based on a decision regarding staged or partial evacuation versus total evacuation of all floors. The determination of need is a function of occupancy classification and building height.

A.11.8.4.2 The Class 1, Type 60, standby power required by 11.8.4.2 is established in accordance with the provisions of Tables 2-2.2 and 2-2.3 of NFPA 110, *Standard for Emergency and Standby Power Systems*. The last class identification in Table 2-2.3 is for those emergency power systems that might have a different minimum running time requirement than those shown in the table. Therefore, it is the intent that the standby power required by 11.8.4.2 have an operation of not less than 1 hour running time before refueling is required.

A.11.8.5 It is not the intent of the paragraph to require any of the equipment in the list, other than the telephone for fire department use, but only to provide the controls, panels, annunciators, and similar equipment at this location if the equipment is provided or required by another section of the *Code*.

CHAPTER 12

A.12.1.2.1 Depending on the character of construction and the hazard of the occupancy, compliance with this requirement will require physical separation by walls of appropriate fire resistance, protection of the other occupancy by automatic sprinklers, or other appropriate measures.

A.12.1.2.4 Example An assembly room for the inmates of a detention occupancy will not normally be subject to simultaneous occupancy.

A.12.1.3 An understanding of the term *accessory room* might be useful to the enforcer of the *Code*, although the term is not used within the *Code*. An accessory room includes a dressing room, the property master's work and storage rooms, the carpenter's room, or similar rooms necessary for legitimate stage operations.

A.12.1.4 Assembly occupancy requirements should be determined on a room-by-room basis, a floor-by-floor basis, and a total building basis. The requirements for each room should be based on the occupant load of that room and the requirements for each floor should be based on the occupant load of that floor, but the requirements for the assembly building overall should be based on the total occupant load. Therefore, it is quite feasible to have several assembly occupancies with

occupant loads of 300 or less grouped together in a single building. Such a building would be an assembly occupancy with an occupant load of over 1000.

A.12.1.7.1 The increase in occupant load above that calculated using occupant load factors from Table 7.3.1.2 is permitted if the provisions of 12.1.7.1 are followed. The owner or operator has the right to submit plans and to be permitted an increase in occupant load if the plans comply with the *Code*. The authority having jurisdiction is permitted to reject the plan for increase in occupant load if the plan is unrealistic, inaccurate, or otherwise does not properly reflect compliance with other *Code* requirements. It is not the intent of the provisions of 12.1.7.1 to prohibit an increase in occupant load solely on the basis of exceeding the limits calculated using occupant load factors from Table 7.3.1.2.

To assist in preventing serious overcrowding incidents in sports arenas, stadia, and similar occupancies, spectator standing room should not be permitted between the seating areas and the playing areas, except in horse race and dog track facilities.

Where a capacity or near-capacity audience is anticipated, all seating should be assigned with tickets showing the section, row, and seat number.

Where standing room is permitted, the capacity of the standing area should meet the following criteria:

- (1) It should be determined on the basis of 5 ft² (0.46 m²) per person.
- (2) It should have its capacity added to the seating capacity in determining egress requirements.
- (3) It should be located to the rear of the seating area.
- (4) It should be assigned standing-room-only tickets according to the area designated for the purpose.

The number of tickets sold or otherwise distributed should not exceed the aggregate number of seats plus the approved standing room numbers.

A.12.2.3.1 Exception No. 1 The seating plan and the means of egress should be reviewed each time the seating is substantially rearranged.

A.12.2.3.3 Exception No. 2 The original *Code* wording permitted certain exceptions such as sports arenas and railway stations. If an assembly occupancy is not similar to one of these occupancies, it is frequently rejected. A list of exceptions also raises the question as to why other occupancies are not included and necessitates additions to the list. For example, an exhibit hall of very large size might have several main entrances/exits. A theater extending the width of a block cannot really have a main entrance/exit in one confined location. A restaurant might have a main entrance serving the parking lot and another main entrance for those entering from the street. The authority having jurisdiction needs to determine where such arrangements are acceptable.

A.12.2.4 It is not the intent to require four means of egress from each level of an assembly occupancy building having a total occupant load of more than 1000 where, individually, the floors have occupant loads of less than 1000.

A.12.2.5.4.2 This requirement and the associated requirement of 12.2.5.4.3 have the effect of prohibiting festival seating unless it truly is a form of seating, such as lawn seating, where generous spaces are commonly maintained between individuals and small groups so that people can circulate freely at any time. Such lawn seating will be characterized by

densities of about one person per 15 ft² (1.4 m²). Both requirements prohibit uncontrolled crowd situations, such as in front of stages at rock music concerts where the number and density of people is uncontrolled by architectural or management features.

A.12.2.5.4.3 This requirement is intended to facilitate rapid emergency access to individuals who are experiencing a medical emergency, especially in the case of cardiopulmonary difficulties, where there is a need for rapid medical attention from trained personnel. The requirement also addresses the need for security and law enforcement personnel to reach individuals whose behavior is endangering themselves and others.

A.12.2.5.4.4 The catchment area served by an aisle accessway or aisle is the portion of the total space that is naturally served by the aisle accessway or aisle. Hence, the requirement for combining the required capacity where paths converge is, in effect, a restatement of the idea of a catchment area. The establishment of catchment areas should be based on a balanced use of all means of egress, with the number of persons in proportion to egress capacity.

A.12.2.5.5 For purposes of the means of egress requirements of this *Code*, tablet-arm chair seating is not considered seating at tables. Dinner theater-style configurations are required to comply with the aisle accessway provisions applying to seating at tables and the aisle requirements of 12.2.5.6, if the aisles contain steps or are ramped. Generally, if aisles contain steps or are ramped, all of this *Code's* requirements for aisles, stairs, and ramps are required to be met. (*Also see 7.1.7 and A.7.1.7.2.*)

A.12.2.5.5.1 Seats having reclining backs are assumed to be in their most upright position when unoccupied.

A.12.2.5.5.3 The system known as *continental seating* has one pair of egress doors provided for every five rows that is located close to the ends of the rows. In previous editions of the *Code*, such egress doors were required to provide a clear width of not less than 66 in. (168 cm) discharging into a foyer, into a lobby, or to the exterior of the building. This continental seating arrangement can result in egress flow times (that is, with nominal flow times of approximately 100 seconds, rather than 200 seconds) that are approximately one-half as long as those resulting where side aisles lead to more remote doors. Such superior egress flow time performance is desirable in some situations; however, special attention should be given either to a comparably good egress capacity for other parts of the egress system or to sufficient space to accommodate queuing outside the seating space.

A.12.2.5.6.3 It is the intent to permit handrails to project not more than 3¹/₂ in. (8.9 cm) into the clear width of aisles required by 12.2.5.6.3.

A.12.2.5.6.4 Technical information about the convenience and safety of ramps and stairs having gradients in the region of 1 in 8 clearly suggests that the goal should be slopes for ramps that are less steep and combinations of stair risers and treads that are, for example, superior to 4-in. (10.2-cm) risers and 32-in. (81-cm) treads. This goal should be kept in mind by designers in establishing the gradient of seating areas to be served by aisles.

A.12.2.5.6.5(2) Tread depth is more important to stair safety than is riser height. Therefore, in cases where the seating

area gradient is less than 5 in 11, it is recommended that the tread dimension be increased beyond 11 in. (27.9 cm) rather than reducing the riser height. Where the seating area gradient exceeds 8 in 11, it is recommended that the riser height be increased while maintaining a tread depth of not less than 11 in. (27.9 cm).

A.12.2.5.6.7 Failure to provide a handrail within a 30-in. (76-cm) horizontal distance of all required portions of the aisle stair width means that the egress capacity calculation is required to be modified as specified by 12.2.3.2(2). This modification might lead to an increase in the aisle width. Although this increase will compensate for reduced egress efficiency, it does not help individuals walking on such portions of stairs to recover from missteps other than by possibly reducing marginally the crowding that might exacerbate the problem of falls. (*See also 7.2.2.4.*)

A.12.2.5.6.8 Certain tread cover materials such as plush carpets, which are often used in theaters, produce an inherently well-marked tread nosing under most lighting conditions. On the other hand, concrete treads have nosings with a sharp edge and, especially under outdoor lighting conditions, are difficult to discriminate. Therefore, concrete trends require an applied marking stripe. The slip resistance of such marking stripes should be similar to the rest of the treads, and no tripping hazard should be created; luminescent, self-luminous, and electroluminescent tread markings have the advantage of being apparent in reduced light or in the absence of light.

A.12.2.5.7 For purposes of the means of egress requirements of this *Code*, seating at counters or at other furnishings is considered to be the same as seating at tables.

A.12.2.5.7.1 Exception Effectively, where the aisle accessway is bounded by movable seating, the 12-in. (30.5-cm) minimum width might be increased by about 15 in. to 30 in. (38 cm to 76 cm) as seating is pushed in toward tables. Moreover, it is such movement of chairs during normal and emergency egress situations that makes the zero-clearance exception workable. The exception also applies to booth seating where people sitting closest to the aisle normally move out ahead of people farthest from the aisle.

A.12.2.5.7.2 See A.12.2.5.8.3.

A.12.2.5.7.3 The minimum width requirement as a function of accessway length is as follows:

- (1) 0 in. (0 cm) for the first 6 ft (1.8 m) of length toward the exit
- (2) 12 in. (30.5 cm) for the next 6 ft (1.8 m), that is, up to 12 ft (3.7 m) of length
- (3) 12 in. to 24 in. (30.5 cm to 61 cm) for lengths from 12 ft to 36 ft (3.7 m to 10.9 m), the maximum length to the closest aisle or egress doorway permitted by 12.2.5.7.4

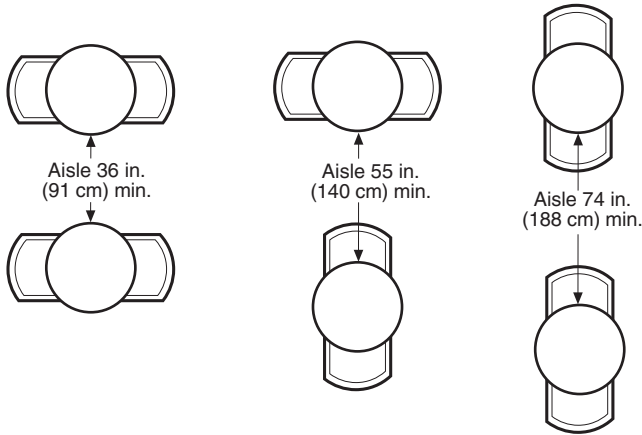
Any additional width needed for seating is to be added to these widths, as described in 12.2.5.8.3.

A.12.2.5.8.1 See 7.1.7 and A.7.1.7.2 for special circulation safety precautions applicable where small elevation differences occur.

A.12.2.5.8.2 It is important to make facilities accessible to people using wheelchairs. See CABO/ANSI A117.1, *American National Standard for Accessible and Usable Buildings and Facilities*, which provides guidance on appropriate aisle widths.

A.12.2.5.8.3 Figure A.12.2.5.8.3 shows typical measurements involving seating and tables abutting an aisle. For purposes of the means of egress requirements of this *Code*, seating at counters or other furnishings is considered to be the same as seating at tables.

FIGURE A.12.2.5.8.3 Seating at tables abutting an aisle.



A.12.2.11.1.1 This requirement includes provisions of guards and rails at the front of boxes, galleries, and balconies, and at aisle accessways adjacent to vomitories and orchestra pits.

A.12.3.1 Exception No. 1 The exception presumes the balcony or mezzanine complies with the other provisions of the *Code*, such as travel distance to exits in accordance with 12.2.6 and numbers of exits in accordance with 12.2.4. For the purposes of this exception, a balcony with glazing that provides a visual awareness of the main assembly area is considered open.

A.12.3.4.2.2 The intent is to require detectors only in nonsprinklered hazardous areas that are unoccupied. When the building is occupied, the detectors in the unoccupied, unsprinklered hazardous areas will initiate occupant notification. If the building is unoccupied, the fire in the nonsprinklered hazardous area is not a life safety issue, and the detectors, upon activation, are not required to notify anyone. The signal from a detector is permitted to be sent to a control panel in an area that is occupied when the building is occupied, but that is unoccupied when the building is unoccupied, without the need for central station monitoring or the equivalent.

A.12.3.5 Exception No. 2 It is the intent to permit a single multipurpose room of less than 12,000 ft² (1100 m²) to have certain small rooms as part of the single room. These rooms could be a kitchen, office, equipment room, and the like. It is also the intent that an addition could be made to an existing building without requiring that the existing building be sprinklered, where both the new and existing buildings have independent means of egress and a fire-rated separation is provided to isolate one building from the other.

A school gymnasium with egress independent of, and separated from, the school would be included in this exception, as would a function hall attached to a church with a similar egress arrangement.

A.12.4.1.1 Life safety evaluations are examples of performance-based approaches to life safety. In this respect, significant guidance in the form and process of life safety evaluations is provided by Chapter 5, keeping in mind the firesafety

emphasis in Chapter 5. The general approach to performance criteria, scenarios, evaluation, safety factors, documentation, maintenance, and periodic assessment (including a warrant of fitness) all apply to the broader considerations in a life safety evaluation. A life safety evaluation deals not only with fire but also with fire, storm, collapse, crowd behavior, and other related safety considerations for which a checklist is provided in A.12.4.1.3. Chapter 5 provides guidance, based on fire safety requirements, for establishing a documented case showing that products of combustion in all conceivable fire scenarios will not significantly endanger occupants using means of egress in the facility (for example, because of fire detection, automatic suppression, smoke control, large-volume space, or management procedures). Moreover, means of egress facilities plus facility management capabilities should be adequate to cope with scenarios where certain egress routes are blocked for some reason.

In addition to making realistic assumptions about the capabilities of persons in the facility (for example, an assembled crowd including many disabled persons or persons unfamiliar with the facility), the life safety evaluation should include a factor of safety of not less than 2.0 in all calculations relating to hazard development time and required egress time (the combination of flow time and other time needed to detect and assess an emergency condition, initiate egress, and move along the egress routes). The factor of safety takes into account the possibility that half of the egress routes might not be used (or be usable) in certain situations.

Regarding crowd behavior, the potential hazards created by larger masses of people and greater crowd densities (which can be problematic during ingress, occupancy, and egress) demand that technology be used by designers, managers, and authorities responsible for buildings to compensate for the relaxed egress capacity provisions of Table 12.4.2.3. In very large buildings for assembly use, the hazard of crowd crushes can exceed that of fire or structural failure. Therefore, the building designers, managers, event planners, security personnel, police authorities, and fire authorities, as well as the building construction authorities, should understand the potential problems and solutions, including coordination of their activities. For crowd behavior, this understanding includes factors of space, energy, time, and information, as well as specific crowd management techniques such as metering. Published guidance on these factors and techniques is found in the *SFPE Handbook of Fire Protection Engineering*, Section 3, Chapter 13, pp. 3-263–3-285 (Pauls, J., “Movement of People”), and the publications referenced therein.

Tables 12.2.3.2 and 12.4.2.3 are based on a linear relationship between number of seats and nominal flow time, with not less than 200 seconds (3.3 minutes) for 2000 seats plus 1 second for every additional 50 seats up to 25,000. Beyond 25,000 total seats, the nominal flow time is limited to 660 seconds (11 minutes). Nominal flow time refers to the flow time for the most able group of patrons; some groups less familiar with the premises or less able groups might take longer to pass a point in the egress system. Although three or more digits are noted in the tables, the resulting calculations should be assumed to provide only two significant figures of precision.

A.12.4.1.3 Factors to be considered in a Life Safety Evaluation include the following:

- (a) Nature of the Events Being Accommodated
 - (1) Ingress, intra-event movement, and egress patterns
 - (2) Ticketing and seating policies/practices

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|---|---|
| <ul style="list-style-type: none"> (3) Event purpose (e.g., sports contest, religious meeting) (4) Emotional qualities (e.g., competitiveness) of event (5) Time of day when event held (6) Time duration of single event (7) Time duration of attendees' occupancy of the building <li style="padding-left: 20px;">(b) Occupant Characteristics and Behavior (1) Homogeneity (2) Cohesiveness (3) Familiarity with building (4) Familiarity with similar events (5) Capability (as influenced by factors such as age, physical abilities) (6) Socioeconomic factors (7) Small minority involved with recreational violence (8) Emotional involvement with the event and other occupants (9) Use of alcohol or drugs (10) Food consumption (11) Washroom utilization <li style="padding-left: 20px;">(c) Management (1) Clear, contractual arrangements for facility operation/use as follows: <ul style="list-style-type: none"> a. Between facility owner and operator b. Between facility operator and event promoter c. Between event promoter and performer d. Between event promoter and attendee e. With police forces f. With private security services g. With ushering services (2) Experience with the building (3) Experience with similar events and attendees (4) Thorough, up-to-date operations manual (5) Training of personnel (6) Supervision of personnel (7) Communications systems and utilization (8) Ratios of management and other personnel to attendees (9) Location/distribution of personnel (10) Central command location (11) Rapport between personnel and attendees (12) Personnel supportive of attendee goals (13) Attendees respect for personnel due to the following: <ul style="list-style-type: none"> a. Dress (uniform) standards b. Age and perceived experience c. Personnel behavior, including interaction d. Distinction between crowd management and control e. Management's concern for facility quality (e.g., cleanliness) f. Management's concern for entire event experience of attendees (i.e., not just during the occupancy of the building) <li style="padding-left: 20px;">(d) Emergency Management Preparedness (1) Complete range of emergencies addressed in operations manual (2) Power loss (3) Fire (4) Severe weather (5) Earthquake (6) Crowd incident (7) Terrorism (8) Hazardous materials (9) Transportation accident (e.g., road, rail, air) (10) Communications systems available | <ul style="list-style-type: none"> (11) Personnel and emergency forces ready to respond (12) Attendees clearly informed of situation and proper behavior <li style="padding-left: 20px;">(e) Building Systems (1) Structural soundness (2) Normal static loads (3) Abnormal static loads (e.g., crowds, precipitation) (4) Dynamic loads (e.g., crowd sway, impact, explosion, wind, earthquake) (5) Stability of nonstructural components (e.g., lighting) (6) Stability of movable (e.g., telescoping) structures (7) Fire protection (8) Fire prevention (e.g., maintenance, contents, house-keeping) (9) Compartmentation (10) Automatic detection and suppression of fire (11) Smoke control (12) Alarm and communications systems (13) Fire department access routes and response capability (14) Structural integrity (15) Weather protection (16) Wind (17) Precipitation (attendees rush for shelter or hold up egress of others) (18) Lightning (19) Circulation systems (20) Flowline or network analysis (21) Waywinding and orientation (22) Merging of paths (e.g., precedence behavior) (23) Decision/branching points (24) Route redundancies (25) Counterflow, crossflow, and queuing situations (26) Control possibilities, including metering (27) Flow capacity adequacy (28) System balance (29) Movement time performance (30) Flow times (31) Travel times (32) Queuing times (33) Route quality (34) Walking surfaces (e.g., traction, discontinuities) (35) Appropriate widths and boundary conditions (36) Handrails, guardrails, and other rails (37) Ramp slopes (38) Step geometries (39) Perceptual aspects (e.g., orientation, signage, marking, lighting, glare, distractions) (40) Route choices, especially for vertical travel (41) Resting/waiting areas (42) Levels of service (overall crowd movement quality) (43) Services (44) Washroom provision and distribution (45) Concessions (46) First aid and EMS facilities (47) General attendee services <p>A scenario-based approach to performance-based fire safety is addressed in Chapter 5. In addition to using such scenarios and, more generally, the attention to performance criteria, evaluation, safety factors, documentation, maintenance, and periodic assessment required when the Chapter 5 option is used, life safety evaluations should consider scenarios based on characteristics important in assembly occupancies. These characteristics include the following:</p> |
|---|---|

- (1) Whether there is a local or mass awareness of an incident, event, or condition that might provoke egress
- (2) Whether the incident, event, or condition stays localized or spreads
- (3) Whether or not egress is designed by facility occupants
- (4) Whether there is a localized start to any egress or mass start to egress
- (5) Whether exits are available or not available

Examples of scenarios and sets of characteristics that might occur in a facility include the following.

(a) *Scenario 1.* Characteristics: Mass start, egress desired (by management and attendees), exits not available, local awareness.

Normal egress at the end of an event occurs just as a severe weather condition induces evacuees at the exterior doors to retard or stop their egress. The backup that occurs in the egress system is not known to most evacuees, who continue to press forward (potentially resulting in a crowd crush).

(b) *Scenario 2.* Characteristics: Mass start, egress not desired (by management), exits possibly not available, mass awareness.

An earthquake occurs during an event. The attendees are relatively safe in the seating area. The means of egress outside the seating areas are relatively unsafe and vulnerable to after-shock damage. Facility management discourages mass egress until the means of egress can be checked and cleared for use.

(c) *Scenario 3.* Characteristics: Local start, incident stays local, egress desired (by attendees and management), exits available, mass awareness.

A localized civil disturbance (for example, firearms violence) provokes localized egress, which is seen by attendees, generally, who then decide to leave also.

(d) *Scenario 4.* Characteristics: Mass start, egress desired, incident spreads, exits not available, mass awareness.

In an open-air facility unprotected from wind, precipitation, and lightning, sudden severe weather prompts egress to shelter but not from the facility. The means of egress congest and block quickly as people in front stop once they are under shelter while people behind them continue to press forward (potentially resulting in a crowd crush).

These scenarios illustrate some of the broader factors to be taken into account when assessing the capability of both building systems and management features on which reliance is placed in a range of situations, not just fire emergencies. Some scenarios also illustrate the conflicting motivations of management and attendees based on differing perceptions of danger and differing knowledge of hazards, countermeasures, and capabilities. Mass egress might not be the most appropriate life safety strategy in some scenarios, such as Scenario 2.

Table A.12.4.1.3 summarizes the characteristics in the scenarios and provides a framework for developing other characteristics and scenarios that might be important for a particular facility, hazard, occupant type, event, or management.

A.12.4.2 Outdoor facilities are not accepted as inherently smoke-protected but must meet the requirements of smoke-protected assembly seating in order to utilize the special requirements for means of egress.

A.12.4.2.1 Exception No. 2 The engineering analysis should be part of the life safety evaluation required by 12.4.1.

A.12.4.5.12 Prior editions of the *Code* required stages to be protected by a Class III standpipe system in accordance with NFPA 14, *Standard for the Installation of Standpipe, Private Hydrant, and Hose Systems*. NFPA 14 requires that Class II and Class III standpipes be automatic — not manual — because they are intended to be used by building occupants. Automatic standpipe systems are required to provide not less than 500 gpm (1893 L/min) at 100 psi (6.9 bar). This requirement often can be met only if a fire pump is installed. Installation of a fire pump presents an unreasonable burden for the system supplying the two hose outlets at the side of the stage. The revised wording of 12.4.5.12 offers some relief by permitting the hose outlets to be in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*.

A.12.4.7 Where a special amusement building is installed inside another building, such as within an exhibit hall, the special amusement building requirements apply only to the special amusement building. For example, the smoke detectors required by 12.4.7.3 are not required to be connected to the building’s system. Where installed in an exhibit hall, such smoke detectors are also required to comply with the provisions applicable to an exhibit.

A.12.4.7.2 It is the intent to provide a suppression system that will act quickly to provide for life safety of the occupants.

A.12.4.7.4.3 Consideration should be given to the provision of directional exit marking on or adjacent to the floor.

A.12.7.1.4(5) NFPA 58, *Liquefied Petroleum Gas Code*, permits portable butane-fueled appliances in restaurants and in attended commercial food catering operations where fueled by not more than two 10-oz (0.28-kg) LP-Gas capacity, nonrefillable butane containers that have a water capacity not exceeding 1.08 lb (0.4 kg) per container. The containers are required to be directly connected to the appliance, and manifold of containers is not permitted. Storage of cylinders is also limited to 24 containers, with an additional 24 permitted where protected by a 2-hour fire resistance-rated barrier.

Table A.12.4.1.3 Life Safety Evaluation Scenario Characteristics Matrix

Scenario	Management						Occupants						
	Local Awareness	Mass Awareness	Incident Localized	Incident Spreads	Egress Desired	Egress Not Desired	Egress Desired	Egress Not Desired	Local Start	Mass Start	Exits Available	Exits Not Available	Other
1	X				X		X			X		X	
2		X				X				X		X	
3		X	X		X		X		X	X			
4		X		X			X			X		X	

A.12.7.2 Exception No. 3(a) Securely supported altar candles in churches that are well separated from any combustible material are permitted. On the other hand, lighted candles carried by children wearing cotton robes present a hazard too great to be permitted. There are many other situations of intermediate hazard where the authority having jurisdiction will have to exercise judgment.

A.12.7.3.3 The term *unprotected materials containing foamed plastic* is meant to include foamed plastic items covered by “thermally-thin” combustible fabrics or paint. (See A.10.2.3.2.)

A.12.7.4.3.4(3) The authority having jurisdiction might use the field flame test contained in NFPA 705, *Recommended Practice for a Field Flame Test for Textiles and Films*, as one method of determining flame retardancy.

A.12.7.4.3.7 Exception No. 3 See A.12.4.1.1.

A.12.7.5 The training program in crowd management should develop a clear appreciation of factors of space, energy, time, and information, as well as specific crowd management techniques such as metering. Published guidelines on these factors and techniques are found in the *SFPE Handbook of Fire Protection Engineering*, Section 3, Chapter 13.

A.12.7.6 It is important that an adequate number of competent attendants are on duty at all times when the assembly occupancy is occupied.

A.12.7.6.3 It is not the intent of this provision to require an announcement in bowling alleys, cocktail lounges, restaurants, or places of worship.

CHAPTER 13

A.13.1.2.1 Depending on the character of construction and the hazard of the occupancy, compliance with this requirement will require physical separation by walls of appropriate fire resistance, protection of the other occupancy by automatic sprinklers, or other appropriate measures.

A.13.1.2.4 Example An assembly room for the inmates of a detention occupancy will not normally be subject to simultaneous occupancy.

A.13.1.3 An understanding of the term *accessory room* might be useful to the enforcer of the *Code*, although the term is not used within the *Code*. An accessory room includes a dressing room, the property master’s work and storage rooms, the carpenter’s room, or similar rooms necessary for legitimate stage operations.

A.13.1.4 Assembly occupancy requirements should be determined on a room-by-room basis, a floor-by-floor basis, and a total building basis. The requirements for each room should be based on the occupant load of that room and the requirements for each floor should be based on the occupant load of that floor, but the requirements for the assembly building overall should be based on the total occupant load. Therefore, it is quite feasible to have several assembly occupancies with occupant loads of 300 or less grouped together in a single building. Such a building would be an assembly occupancy with an occupant load of over 1000.

A.13.1.7.1 The increase in occupant load above that calculated using occupant load factors from Table 7.3.1.2 is permitted, if the provisions of 13.1.7.1 are followed. The owner or operator has the right to submit plans and to be permitted an increase in occupant load if the plans comply with the *Code*. The authority having jurisdiction is permitted to reject the

plan for increase in occupant load if the plan is unrealistic, inaccurate, or otherwise does not properly reflect compliance with other *Code* requirements. It is not the intent of the provisions of 13.1.7.1 to prohibit an increase in occupant load solely on the basis of exceeding the limits calculated using occupant load factors from Table 7.3.1.2.

Existing auditorium and arena structures might not be designed for the added occupant load beyond the fixed seating. The authority having jurisdiction should consider exit access and aisles before permitting additional occupant load in areas using seating such as festival seating or movable seating on the auditorium or arena floor area.

To assist in preventing serious overcrowding incidents in sports arenas, stadia, and similar occupancies, spectator standing room should not be permitted between the seating areas and the playing areas, except in horse race and dog track facilities.

Where a capacity or near-capacity audience is anticipated, all seating should be assigned with tickets showing the section, row, and seat number.

Where standing room is permitted, the capacity of the standing area should meet the following criteria:

- (1) It should be determined on the basis of 5 ft² (0.46 m²) per person.
- (2) It should have its capacity added to the seating capacity in determining egress requirements.
- (3) It should be located to the rear of the seating area.
- (4) It should be assigned standing-room-only tickets according to the area designated for the purpose.

The number of tickets sold or otherwise distributed should not exceed the aggregate number of seats plus the approved standing room numbers.

A.13.2.2.3.1 Exception No. 1 The seating plan and the means of egress should be reviewed each time the seating is substantially rearranged.

A.13.2.3.3 Exception No. 2 The original *Code* wording permitted certain exceptions such as sports arenas and railway stations. If an assembly occupancy is not similar to one of these occupancies, it is frequently rejected. A list of exceptions also raises the question as to why other occupancies are not included and necessitates additions to the list. For example, an exhibit hall of very large size might have several main entrances/exits. A theater extending the width of a block cannot really have a main entrance/exit in one confined location. A restaurant might have a main entrance serving the parking lot and another main entrance for those entering from the street. The authority having jurisdiction needs to determine where such arrangements are acceptable.

A.13.2.4 It is not the intent to require four means of egress from each level of an assembly occupancy building having a total occupant load of more than 1000 where, individually, the floors have occupant loads of less than 1000.

A.13.2.5.4.2 This requirement and the associated requirement of 13.2.5.4.3 have the effect of prohibiting festival seating unless it truly is a form of seating, such as lawn seating, where generous spaces are commonly maintained between individuals and small groups so that people can circulate freely at any time. Such lawn seating will be characterized by densities of about one person per 15 ft² (1.4 m²). Both requirements prohibit uncontrolled crowd situations, such as in front of stages at rock music concerts where the number and density of people is uncontrolled by architectural or management features.

A.13.2.5.4.3 This requirement is intended to facilitate rapid emergency access to individuals who are experiencing a medical emergency, especially in the case of cardiopulmonary difficulties, where there is a need for rapid medical attention from trained personnel. The requirement also addresses the need for security and law enforcement personnel to reach individuals whose behavior is endangering themselves and others.

A.13.2.5.4.4 The catchment area served by an aisle accessway or aisle is the portion of the total space that is naturally served by the aisle accessway or aisle. Hence, the requirement for combining the required capacity where paths converge is, in effect, a restatement of the idea of a catchment area. The establishment of catchment areas should be based on a balanced use of all means of egress, with the number of persons in proportion to egress capacity.

A.13.2.5.5 For purposes of the means of egress requirements of this *Code*, tablet-arm chair seating is not considered seating at tables. Dinner theater-style configurations are required to comply with the aisle accessway provisions applying to seating at tables and the aisle requirements of 13.2.5.6, if the aisles contain steps or are ramped. Generally, if aisles contain steps or are ramped, all of this *Code's* requirements for aisles, stairs, and ramps are required to be met. (Also see 7.1.7 and A.7.1.7.2.)

A.13.2.5.5.1 Seats having reclining backs are assumed to be in their most upright position when unoccupied.

A.13.2.5.5.3 The system known as *continental seating* has one pair of egress doors provided for every five rows that is located close to the ends of the rows. In previous editions of the *Code*, such egress doors were required to provide a clear width of not less than 66 in. (168 cm) discharging into a foyer, into a lobby, or to the exterior of the building. This continental seating arrangement can result in egress flow times (that is, with nominal flow times of approximately 100 seconds rather than 200 seconds) that are approximately one-half as long as those resulting where side aisles lead to more remote doors. Such superior egress flow time performance is desirable in some situations; however, special attention should be given either to a comparably good egress capacity for other parts of the egress system or to sufficient space to accommodate queuing outside the seating space.

A.13.2.5.6.3 It is the intent to permit handrails to project not more than $3\frac{1}{2}$ in. (8.9 cm) into the clear width of aisles required by 13.2.5.6.3.

A.13.2.5.6.4 Technical information about the convenience and safety of ramps and stairs having gradients in the region of 1 in 8 clearly suggests that the goal should be slopes for ramps that are less steep and combinations of stair risers and treads that are, for example, superior to 4-in. (10.2-cm) risers and 32-in. (81-cm) treads. This goal should be kept in mind by designers in establishing the gradient of seating areas to be served by aisles.

A.13.2.5.6.5 Exception No. 1 Completely uniform tread dimensions are preferred over aisle stair designs where tread depths alternate between relatively small intermediate treads between seating platforms and relatively large treads at seating platforms. A larger tread that is level with the seating platform is not needed to facilitate easy access to and egress from a row of seating. If this arrangement is used, it is important to provide a tread depth that is better than minimum for the intermediate tread;

hence, 13 in. (33.0 cm) is specified. Where nonuniformities exist due to construction tolerance, they should not exceed $\frac{3}{16}$ in. (0.5 cm) between adjacent treads.

A.13.2.5.6.5(2) Tread depth is more important to stair safety than is riser height. Therefore, in cases where the seating area gradient is less than 5 in 11, it is recommended that the tread dimension be increased beyond 11 in. (27.9 cm) rather than reducing the riser height. Where the seating area gradient exceeds 8 in 11, it is recommended that the riser height be increased while maintaining a tread depth of not less than 11 in. (27.9 cm).

A.13.2.5.6.7 Failure to provide a handrail within a 30-in. (76-cm) horizontal distance of all required portions of the aisle stair width means that the egress capacity calculation is required to be modified as specified by 13.2.3.2(2). This modification might lead to an increase in the aisle width. Although this increase will compensate for reduced egress efficiency, it does not help individuals walking on such portions of stairs to recover from missteps other than by possibly reducing marginally the crowding that might exacerbate the problem of falls. (See also 7.2.2.4.)

A.13.2.5.6.8 Certain tread cover materials such as plush carpets, which are often used in theaters, produce an inherently well-marked tread nosing under most lighting conditions. On the other hand, concrete treads have nosings with a sharp edge and, especially under outdoor lighting conditions, are difficult to discriminate. Therefore, concrete treads require an applied marking stripe. The slip resistance of such marking stripes should be similar to the rest of the treads, and no tripping hazard should be created; luminescent, self-luminous, and electroluminescent tread markings have the advantage of being apparent in reduced light or in the absence of light.

A.13.2.5.7 For purposes of the means of egress requirements of this *Code*, seating at counters or at other furnishings is considered to be the same as seating at tables.

A.13.2.5.7.1 Exception Effectively, where the aisle accessway is bounded by movable seating, the 12-in. (30.5-cm) minimum width might be increased by about 15 in. to 30 in. (38 cm to 76 cm) as seating is pushed in toward tables. Moreover, it is such movement of chairs during normal and emergency egress situations that makes the zero-clearance exception workable. The exception also applies to booth seating where people sitting closest to the aisle normally move out ahead of people farthest from the aisle.

A.13.2.5.7.2 See A.13.2.5.8.3.

A.13.2.5.7.3 The minimum width requirement as a function of accessway length is as follows:

- (1) 0 in. (0 cm) for the first 6 ft (1.8 m) of length toward the exit
- (2) 12 in. (30.5 cm) for the next 6 ft (1.8 m), that is, up to 12 ft (3.7 m) of length
- (3) 12 in. to 24 in. (30.5 cm to 61 cm) for lengths from 12 ft to 36 ft (3.7 m to 10.9 m), the maximum length to the closest aisle or egress doorway permitted by 13.2.5.7.4

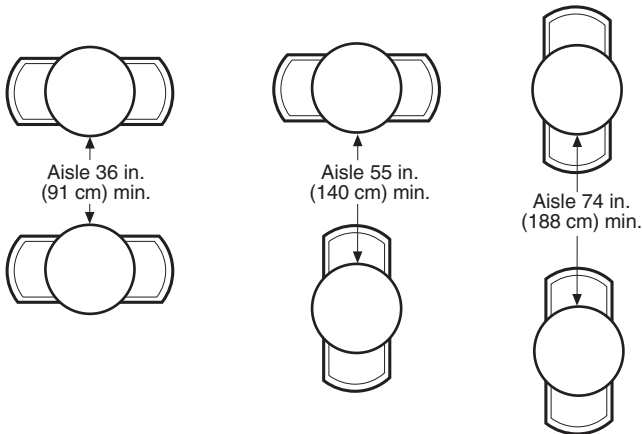
Any additional width needed for seating is to be added to these widths, as described in 13.2.5.8.3.

A.13.2.5.8.1 See 7.1.7 and A.7.1.7.2 for special circulation safety precautions applicable where small elevation differences occur.

A.13.2.5.8.2 It is important to make facilities accessible to people using wheelchairs. See CABO/ANSI A117.1 *American National Standard for Accessible and Usable Buildings and Facilities*, which provides guidance on appropriate aisle widths.

A.13.2.5.8.3 Figure A.13.2.5.8.3 shows typical measurements involving seating and tables abutting an aisle. Note that, for purposes of the means of egress requirements of this *Code*, seating at counters or other furnishings is considered to be the same as seating at tables.

FIGURE A.13.2.5.8.3 Seating at tables abutting an aisle.



A.13.3.1 Exception No. 1 The exception presumes the balcony or mezzanine complies with the other provisions of the *Code*, such as travel distance to exits in accordance with 13.2.6 and numbers of exits in accordance with 13.2.4. For the purposes of this exception, a balcony with glazing that provides a visual awareness of the main assembly area is considered open.

A.13.3.2.1.3(1) It is not the intent of this provision to require a smoke barrier that meets the requirements of Section 8.3.

A.13.3.4.2.2 The intent is to require detectors only in non-sprinklered hazardous areas that are unoccupied. Where the building is occupied, the detectors in the unoccupied, unsprinklered hazardous areas will initiate occupant notification. If the building is unoccupied, the fire in the nonsprinklered hazardous area is not a life safety issue, and the detectors, upon activation, are not required to notify anyone. The signal from a detector is permitted to be sent to a control panel in an area that is occupied when the building is occupied, but that is unoccupied when the building is unoccupied, without the need for central station monitoring or the equivalent.

A.13.4.1.1 Life safety evaluations are examples of performance-based approaches to life safety. In this respect, significant guidance in the form and process of life safety evaluations is provided by Chapter 5, keeping in mind the firesafety emphasis in Chapter 5. The general approach to performance criteria, scenarios, evaluation, safety factors, documentation, maintenance, and periodic assessment (including a warrant of fitness) all apply to the broader considerations in a life safety evaluation. A life safety evaluation deals not only with fire but also with fire, storm, collapse, crowd behavior, and other related safety considerations for which a checklist is provided in A.13.4.1.3. Chapter 5 provides guidance, based on fire safety requirements, for establishing a documented case show-

ing that products of combustion in all conceivable fire scenarios will not significantly endanger occupants using means of egress in the facility (for example, because of fire detection, automatic suppression, smoke control, large-volume space, or management procedures). Moreover, means of egress facilities plus facility management capabilities should be adequate to cope with scenarios where certain egress routes are blocked for some reason.

In addition to making realistic assumptions about the capabilities of persons in the facility (for example, an assembled crowd including many disabled persons or persons unfamiliar with the facility), the life safety evaluation should include a factor of safety of not less than 2.0 in all calculations relating to hazard development time and required egress time (the combination of flow time and other time needed to detect and assess an emergency condition, initiate egress, and move along the egress routes). This factor of safety takes into account the possibility that half of the egress routes might not be used (or usable) in certain situations.

Regarding crowd behavior, the potential hazards created by larger masses of people and greater crowd densities (which can be problematic during ingress, occupancy, and egress) demand that technology be used by designers, managers, and authorities responsible for buildings to compensate for the relaxed egress capacity provisions of Table 13.4.2.3. In very large buildings for assembly use, the hazard of crowd crushes can exceed that of fire or structural failure. Therefore, the building designers, managers, event planners, security personnel, police authorities, and fire authorities, as well as the building construction authorities, should understand the potential problems and solutions, including coordination of their activities. For crowd behavior, this understanding includes factors of space, energy, time, and information, as well as specific crowd management techniques such as metering. Published guidance on these factors and techniques is found in the *SFPE Handbook of Fire Protection Engineering*, Section 3, Chapter 13, pp. 3-263-3-285 (Pauls, J., "Movement of People") and the publications referenced therein.

Tables 13.2.3.2 and 13.4.2.3 are based on a linear relationship between number of seats and nominal flow time, with not less than 200 seconds (3.3 minutes) for 2000 seats plus 1 second for every additional 50 seats up to 25,000. Beyond 25,000 total seats, the nominal flow time is limited to 660 seconds (11 minutes). Nominal flow time refers to the flow time for the most able group of patrons; some groups less familiar with the premises or less able groups might take longer to pass a point in the egress system. Although three or more digits are noted in the tables, the resulting calculations should be assumed to provide only two significant figures of precision.

A.13.4.1.3 Factors to be considered in a life safety evaluation might include the following.

(a) Nature of the Events Being Accommodated

- (1) Ingress, intra-event movement, and egress patterns
- (2) Ticketing and seating policies/practices
- (3) Event purpose (e.g., sports contest, religious meeting)
- (4) Emotional qualities (e.g., competitiveness) of event
- (5) Time of day when event held
- (6) Time duration of single event
- (7) Time duration of attendees' occupancy of the building

(b) Occupant Characteristics and Behavior

- (1) Homogeneity
- (2) Cohesiveness

- | | |
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| <ul style="list-style-type: none"> (3) Familiarity with building (4) Familiarity with similar events (5) Capability (as influenced by factors such as age, physical abilities) (6) Socioeconomic factors (7) Small minority involved with recreational violence (8) Emotional involvement with the event and other occupants (9) Use of alcohol or drugs (10) Food consumption (11) Washroom utilization (c) Management (1) Clear, contractual arrangements for facility operation/use as follows: <ul style="list-style-type: none"> a. Between facility owner and operator b. Between facility operator and event promoter c. Between event promoter and performer d. Between event promoter and attendee e. With police forces f. With private security services g. With ushering services (2) Experience with the building (3) Experience with similar events and attendees (4) Thorough, up-to-date operations manual (5) Training of personnel (6) Supervision of personnel (7) Communications systems and utilization (8) Ratios of management and other personnel to attendees (9) Location/distribution of personnel (10) Central command location (11) Rapport between personnel and attendees (12) Personnel supportive of attendee goals (13) Attendees respect for personnel due to the following: <ul style="list-style-type: none"> a. Dress (uniform) standards b. Age and perceived experience c. Personnel behavior, including interaction d. Distinction between crowd management and control e. Management's concern for facility quality (e.g., cleanliness) f. Management's concern for entire event experience of attendees (i.e., not just during the occupancy of the building) (d) Emergency Management Preparedness (1) Complete range of emergencies addressed in operations manual (2) Power loss (3) Fire (4) Severe weather (5) Earthquake (6) Crowd incident (7) Terrorism (8) Hazardous materials (9) Transportation accident (e.g., road, rail, air) (10) Communications systems available (11) Personnel and emergency forces ready to respond (12) Attendees clearly informed of situation and proper behavior (e) Building Systems (1) Structural soundness (2) Normal static loads (3) Abnormal static loads (e.g., crowds, precipitation) | <ul style="list-style-type: none"> (4) Dynamic loads (e.g., crowd sway, impact, explosion, wind, earthquake) (5) Stability of nonstructural components (e.g., lighting) (6) Stability of movable (e.g., telescoping) structures (7) Fire protection (8) Fire prevention (e.g., maintenance, contents, housekeeping) (9) Compartmentation (10) Automatic detection and suppression of fire (11) Smoke control (12) Alarm and communications systems (13) Fire department access routes and response capability (14) Structural integrity (15) Weather protection (16) Wind (17) Precipitation (attendees rush for shelter or hold up egress of others) (18) Lightning (19) Circulation systems (20) Flowline or network analysis (21) Waywinding and orientation (22) Merging of paths (e.g., precedence behavior) (23) Decision/branching points (24) Route redundancies (25) Counterflow, crossflow, and queuing situations (26) Control possibilities, including metering (27) Flow capacity adequacy (28) System balance (29) Movement time performance (30) Flow times (31) Travel times (32) Queuing times (33) Route quality (34) Walking surfaces (e.g., traction, discontinuities) (35) Appropriate widths and boundary conditions (36) Handrails, guardrails, and other rails (37) Ramp slopes (38) Step geometries (39) Perceptual aspects (e.g., orientation, signage, marking, lighting, glare, distractions) (40) Route choices, especially for vertical travel (41) Resting/waiting areas (42) Levels of service (overall crowd movement quality) (43) Services (44) Washroom provision and distribution (45) Concessions (46) First aid and EMS facilities (47) General attendee services <p>A scenario-based approach to performance-based fire safety is addressed in Chapter 5. In addition to utilizing such scenarios and, more generally, the attention to performance criteria, evaluation, safety factors, documentation, maintenance, and periodic assessment required when the Chapter 5 option is used, life safety evaluations should consider scenarios based on characteristics important in assembly occupancies. These characteristics include the following:</p> <ul style="list-style-type: none"> (1) Whether there is a local or mass awareness of an incident, event, or condition that might provoke egress (2) Whether the incident, event, or condition stays localized or spreads (3) Whether or not egress is designed by facility occupants (4) Whether there is a localized start to any egress or mass start to egress (5) Whether exits are available or not available |
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Examples of scenarios and sets of characteristics that might occur in a facility include the following:

(a) *Scenario 1.* Characteristics: Mass start, egress desired (by management and attendees), exits not available, local awareness.

Normal egress at the end of an event occurs just as a severe weather condition induces evacuees at the exterior doors to retard or stop their egress. The backup that occurs in the egress system is not known to most evacuees, who continue to press forward potentially resulting in a crowd crush.

(b) *Scenario 2.* Characteristics: Mass start, egress not desired (by management), exits possibly not available, mass awareness.

An earthquake occurs during an event. The attendees are relatively safe in the seating area. The means of egress outside the seating areas are relatively unsafe and vulnerable to after-shock damage. Facility management discourages mass egress until the means of egress can be checked and cleared for use.

(c) *Scenario 3.* Characteristics: Local start, incident stays local, egress desired (by attendees and management), exits available, mass awareness.

A localized civil disturbance (for example, firearms violence) provokes localized egress, which is seen by attendees, generally, who then decide to leave also.

(d) *Scenario 4.* Characteristics: Mass start, egress desired, incident spreads, exits not available, mass awareness.

In an open-air facility unprotected from wind, precipitation, and lightning, sudden severe weather prompts egress to shelter but not from the facility. The means of egress congest and block quickly as people in front stop once they are under shelter while people behind them continue to press forward, potentially resulting in a crowd crush.

These scenarios illustrate some of the broader factors to be taken into account when assessing the capability of both building systems and management features on which reliance is placed in a range of situations, not just fire emergencies. Some scenarios also illustrate the conflicting motivations of management and attendees based on differing perceptions of danger and differing knowledge of hazards, countermeasures, and capabilities. Mass egress might not be the most appropriate life safety strategy in some scenarios, such as Scenario 2.

Table A.13.4.1.3 summarizes the characteristics in the scenarios and provides a framework for developing other characteristics and scenarios that might be important for a particular facility, hazard, occupant type, event, or management.

A.13.4.2 Outdoor facilities are not accepted as inherently smoke-protected but must meet the requirements of smoke-protected assembly seating in order to use the special requirements for means of egress.

A.13.4.2.1 Exception No. 2 The engineering analysis should be part of the life safety evaluation required by 13.4.1.

A.13.4.5.12 Prior editions of the *Code* required stages to be protected by a Class III standpipe system in accordance with NFPA 14, *Standard for the Installation of Standpipe, Private Hydrant, and Hose Systems*. NFPA 14 requires that Class II and Class III standpipes be automatic — not manual — because they are intended to be used by building occupants. Automatic standpipe systems are required to provide not less than 500 gpm (1893 L/min) at 100 psi (6.9 bar). This requirement often can be met only if a fire pump is installed. Installation of a fire pump presents an unreasonable burden for the system supplying the two hose outlets at the side of the stage. The revised wording of 13.4.5.12 offers some relief by permitting the hose outlets to be in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*.

A.13.4.7 Where a special amusement building is installed inside another building, such as within an exhibit hall, the special amusement building requirements apply only to the special amusement building. For example, the smoke detectors required by 13.4.7.3 are not required to be connected to the building's system. Where installed in an exhibit hall, such smoke detectors are also required to comply with the provisions applicable to an exhibit.

A.13.4.7.2 It is the intent to provide a suppression system that will act quickly to provide for life safety of the occupants.

A.13.4.7.4.3 Consideration should be given to the provision of directional exit marking on or adjacent to the floor.

A.13.7.1.4(5) NFPA 58, *Liquefied Petroleum Gas Code*, permits portable butane-fueled appliances in restaurants and in attended commercial food catering operations where fueled by not in excess of two 10-oz (0.28-kg) LP-Gas capacity, nonrefillable butane containers that have a water capacity not exceeding 1.08 lb (0.4 kg) per container. The containers are required to be directly connected to the appliance, and manifold of containers is not permitted. Storage of cylinders is also limited to 24 containers, with and additional 24 permitted where protected by a 2-hour fire resistance-rated barrier.

A.13.7.2 Exception No. 3(a) Securely supported altar candles in churches that are well separated from any combustible material, are permitted. On the other hand, lighted candles carried by children wearing cotton robes present a hazard too great to be permitted. There are many other situations of intermediate hazard where the authority having jurisdiction will have to exercise judgment.

Table A.13.4.1.3 Life Safety Evaluation Scenario Characteristics Matrix

Scenario	Management						Occupants						
	Local Awareness	Mass Awareness	Incident Localized	Incident Spreads	Egress Desired	Egress Not Desired	Egress Desired	Egress Not Desired	Local Start	Mass Start	Exits Available	Exits Not Available	Other
1	X				X		X			X		X	
2		X				X				X		X	
3		X	X		X		X		X	X			
4		X		X			X			X		X	

A.13.7.3.3 The term *unprotected materials containing foamed plastic* is meant to include foamed plastic items covered by “thermally-thin” combustible fabrics or paint. (See A.10.2.3.2.)

A.13.7.4.3.4(3) The authority having jurisdiction might use the field flame test contained in NFPA 705, *Recommended Practice for a Field Flame Test for Textiles and Films*, as one method of determining flame retardancy.

A.13.7.4.3.7 Exception No. 3 See A.13.4.1.1.

A.13.7.5 The training program in crowd management should develop a clear appreciation of factors of space, energy, time, and information, as well as specific crowd management techniques such as metering. Published guidelines on these factors and techniques are found in the *SFPE Handbook of Fire Protection Engineering*, Section 3, Chapter 13.

A.13.7.6 It is important that an adequate number of competent attendants are on duty at all times when the assembly occupancy is occupied.

A.13.7.6.3 It is not the intent of this provision to require an announcement in bowling alleys, cocktail lounges, restaurants, or places of worship.

CHAPTER 14

A.14.2.2.3 See A.7.2.2.4.5(1), Exception No. 3, regarding additional handrails on stairs that are used extensively by children 5 years of age or less.

A.14.2.5.7 A corridor roofed over and enclosed on its long side and open to the atmosphere at the end is permitted to be considered an exterior corridor if either of the following criteria are met:

- (1) Clear story openings for the corridor are provided on both sides of the corridor and above adjacent roofs or buildings, and such clear openings are not less than one-half the height of the corridor walls.
- (2) The corridor roof has unobstructed openings to the sky not less than 50 percent of the area of the roof.

The openings are to be equally distributed, and, if louvers are installed, they are to be fixed open with a clear area based on the actual openings between louver vanes.

A.14.2.11.1 It is highly desirable that all windows be of a type that can be readily opened from inside and to have them large enough and low enough for use by students, teachers, and fire fighters. Windows are permitted to serve as a supplementary means of emergency escape, particularly where ladders can be raised by fire fighters or others.

A.14.7.1.1 The requirements are, of necessity, general in scope, as it is recognized that they apply to all types of educational occupancies as well as conditions of occupancies, such as truant schools; schools for the mentally handicapped, vision impaired, hearing impaired, and speech impaired; and public schools. It is fully recognized that no one code can meet all the conditions of the various buildings involved, and it will be necessary for site administrators to issue supplements to these requirements, but all supplements should be consistent with these requirements.

A.14.7.2.1 Particular attention should be given to keeping all doors unlocked; keeping doors that serve to protect the safety of paths of egress closed and under no conditions blocked open, such as doors on stairway enclosures; keeping outside stairs and fire escape stairs free from all obstructions and clear

of snow and ice; and allowing no accumulation of snow or ice or materials of any kind outside exit doors that might prevent the opening of the door or interfere with rapid escape from the building.

Any condition likely to interfere with safe egress should be corrected immediately, if possible, or otherwise should be reported at once to the appropriate authorities.

CHAPTER 15

A.15.2.2.3 See A.7.2.2.4.5(1), Exception No. 3, regarding additional handrails on stairs that are used extensively by children 5 years of age or less.

A.15.2.5.7 A corridor roofed over and enclosed on its long side and open to the atmosphere at the end is permitted to be considered an exterior corridor if either of the following criteria are met:

- (1) Clear story openings for the corridor are provided on both sides of the corridor and above adjacent roofs or buildings, and such clear openings are not less than one-half the height of the corridor walls.
- (2) The corridor roof has unobstructed openings to the sky not less than 50 percent of the area of the roof.

The openings are to be equally distributed, and, if louvers are installed, they are to be fixed open with a clear area based on the actual openings between louver vanes.

A.15.2.11.1 It is highly desirable that all windows be of a type that can be readily opened from inside and to have them large enough and low enough for use by students, teachers, and fire fighters. Windows are permitted to serve as a supplementary means of emergency escape, particularly where ladders can be raised by fire fighters or others.

A.15.3.6 Exception No. 2 The exception permits valve supervision in accordance with Section 9.7 rather than requiring that the entire automatic sprinkler system be electrically supervised. It is intended that the valve supervision be performed electrically, not by chaining and locking the valves in the open position.

A.15.7.1.1 The requirements are, of necessity, general in scope, as it is recognized that they apply to all types of educational occupancies as well as conditions of occupancies, such as truant schools; schools for the mentally handicapped, vision impaired, hearing impaired, and speech impaired; and public schools. It is fully recognized that no one code can meet all the conditions of the various buildings involved, and it will be necessary for site administrators to issue supplements to these requirements, but all supplements should be consistent with these requirements.

A.15.7.2.1 Particular attention should be given to keeping all doors unlocked; keeping doors that serve to protect the safety of paths of egress closed and under no conditions blocked open, such as doors on stairway enclosures; keeping outside stairs and fire escape stairs free from all obstructions and clear of snow and ice; and allowing no accumulation of snow or ice or materials of any kind outside exit doors that might prevent the opening of the door or interfere with rapid escape from the building.

Any condition likely to interfere with safe egress should be corrected immediately, if possible, or otherwise should be reported at once to the appropriate authorities.

CHAPTER 16

A.16.1.1 Day-care occupancies do not provide for the full-time maintenance of a client. Occupancies that provide a primary place of residence are addressed in other occupancy chapters. (See Chapters 24 through 33.)

The requirements of Chapter 16 are based on the need to adequately protect the occupants in case of fire. The requirements assume that adequate staffing will be available and are based on staffing similar to that outlined in Table A.16.1.1.

Table A.16.1.1 Staffing

Staff-to-Client Ratio	Age (months)
1:3	0–24
1:4	25–36
1:7	37–60
1:10	61–96
1:12	≥97
1:3	Clients incapable of self-preservation

If staff-to-client ratios fall below that suggested by Table A.16.1.1, it is the responsibility of the authority having jurisdiction to determine the additional safeguards beyond the requirements of Chapter 16 that are necessary. Typical additional provisions might include restricting the day-care occupancy to the level of exit discharge, requiring additional smoke detection, requiring automatic sprinkler protection, requiring better or additional means of egress, and similar types of items, depending on the situation.

A.16.1.4.3 A conversion from a day-care occupancy with more than 12 clients to a day-care home is not considered a change of occupancy. The resulting day-care home should be permitted to meet the requirements of Chapter 17 for existing day-care homes.

A.16.2.2.4 The purpose of this requirement is to prevent arrangements where a child can be trapped in a closet. It is intended that this provision be broadly interpreted by the authority having jurisdiction to include equipment such as refrigerators and freezers.

A.16.2.2.3 See A.7.2.2.4.5(1), Exception No. 3, regarding additional handrails on stairs that are used extensively by children 5 years of age or less.

A.16.3.2.1(2)a It is not the intent to classify a room with a domestic-type clothes washer and a domestic-type clothes dryer as a laundry.

A.16.6.1.4.2 A conversion from a day-care occupancy with more than 12 clients to a day-care home is not considered a change of occupancy. The resulting day-care home should be permitted to meet the requirements of Chapter 17 for existing day-care homes.

A.16.7.1 The requirements are, of necessity, general in scope, as it is recognized that they apply to all types of day-care occupancies as well as conditions of occupancies, such as truant day-care occupancies; occupancies for the mentally handicapped, vision impaired, hearing impaired, and speech impaired; adult day-care; care of infants; and day-care occupancies. It is fully recognized that no one code can meet all the conditions of the various buildings involved, and it will

be necessary for site administrators, through the written fire emergency response plan, to issue supplements to these requirements; however, all supplements should be consistent with these requirements. Additionally, it is recommended that fire safety be a part of the educational programs of the occupancy for clients.

Fire emergency response plans need to be written and made available to all employees, including temporary or substitute staff, so that all employees know what is expected of them during a fire emergency. The elements needed in the written plan should be identified in coordination with the authority having jurisdiction.

The facility fire emergency response plan might be a module of a facility disaster plan that covers other emergencies.

The proper safeguarding of clients during a fire emergency requires prompt and effective response by the facility employees in accordance with the fire emergency response plan. Duties covered under the plan should be assigned by position rather than by employee name. Such assignment ensures that, in the absence of an employee, the duties of the position will be performed by a substitute or temporary employee assigned to the position. Temporary or substitute employees should be instructed in advance regarding their duties under the plan for the position to which they are assigned.

Written fire emergency response plans should include, but should not be limited to, information for employees regarding methods and devices available for alerting occupants of a fire emergency. Employees should know how the fire department is to be alerted. Even where automatic systems are expected to alert the fire department, the written plan should provide for backup alerting procedures by staff. Other responses of employees to a fire emergency should include the following:

- (1) Removal of clients in immediate danger to areas of safety, as set forth in the plan
- (2) Methods of using building features to confine the fire and its byproducts to the room or area of origin
- (3) The control of actions and behaviors of clients during removal or evacuation activities and at predetermined safe assembly areas

The written plan should state clearly the facility policy regarding the actions staff are to take or not take to extinguish a fire.

The written fire emergency response plan should incorporate the emergency egress and relocation drill procedures set forth in 16.7.2.

A.16.7.2.1 The requirements are, of necessity, general in scope, as it is recognized that they apply to all types of day-care occupancies as well as conditions of occupancies, such as truant day-care occupancies; day-care occupancies for the mentally handicapped, vision impaired, hearing impaired, and speech impaired. It is fully recognized that no one code can meet all the conditions of the various buildings involved, and it will be necessary for site administrators to issue supplements to these requirements, but all supplements should be consistent with these requirements.

A.16.7.3.2 Particular attention should be given to keeping all doors unlocked; keeping doors that serve to protect the safety of paths of egress closed and under no conditions blocked open, such as doors on stairway enclosures; keeping outside stairs and fire escape stairs free from all obstructions and clear of snow and ice; and allowing no accumulation of snow or ice or materials of any kind outside exit doors that might prevent the opening of the door or interfere with rapid escape from the building.

A.16.7.5 It is the intent that the requirement for adequate adult staff to be awake at all times when clients are present be applied to family day-care and group day-care homes that are operated at night, as well as day-care occupancies.

CHAPTER 17

A.17.1.1 Day-care occupancies do not provide for the full-time maintenance of a client. Occupancies that provide a primary place of residence are addressed in other occupancies. (See Chapters 24 through 33.)

The requirements of Chapter 17 are based on the need to adequately protect the occupants in case of fire. The requirements assume that adequate staffing will be available and are based on staffing similar to that outlined in Table A.17.1.1.

Table A.17.1.1 Staffing

Staff-to-Client Ratio	Age (months)
1:3	0–24
1:4	25–36
1:7	37–60
1:10	61–96
1:12	≥97
1:3	Clients incapable of self-preservation

If staff-to-client ratios fall below that suggested by Table A.17.1.1, it is the responsibility of the authority having jurisdiction to determine the additional safeguards beyond the requirements of Chapter 17 that are necessary. Typical additional provisions might include restricting the day-care occupancy to the level of exit discharge, requiring additional smoke detection, requiring automatic sprinkler protection, requiring better or additional means of egress, and similar types of items, depending on the situation.

A.17.1.4.3 A conversion from a day-care occupancy with more than 12 clients to a day-care home is not considered a change of occupancy. The resulting day-care home should be permitted to meet the requirements of Chapter 17 for existing day-care homes.

A.17.2.2.4 The purpose of this requirement is to prevent arrangements where a client can be trapped in a closet. It is intended that this provision be broadly interpreted by the authority having jurisdiction to include equipment such as refrigerators and freezers.

A.17.2.3 See A.7.2.2.4.5(1), Exception No. 3, regarding additional handrails on stairs that are used extensively by children 5 years of age or less.

A.17.3.2.1(2)a It is not the intent to classify a room with a domestic-type clothes washer and a domestic-type clothes dryer as a laundry.

A.17.6.1.1.2 Day-care homes do not provide for the full-time maintenance of a client. Day-care occupancies that provide a primary place of residence are addressed in other day-care occupancy chapters. (See Chapters 24 through 33.)

A.17.6.1.4.2 A conversion from a day-care occupancy with more than 12 clients to a day-care home is not considered a change of occupancy. The resulting day-care home should be

permitted to meet the requirements of Chapter 17 for existing day-care homes.

A.17.7.1 The requirements are, of necessity, general in scope, as it is recognized that they apply to all types of day-care occupancies as well as conditions of occupancies, such as truant day-care occupancies; occupancies for the mentally handicapped, vision impaired, hearing impaired, and speech impaired; adult day-care; care of infants; and day-care occupancies. It is fully recognized that no one code can meet all the conditions of the various buildings involved, and it will be necessary for site administrators, through the written fire emergency response plan, to issue supplements to these requirements; however, all supplements should be consistent with these requirements. Additionally, it is recommended that fire safety be a part of the educational programs of the occupancy for clients.

Fire emergency response plans need to be written and made available to all employees, including temporary or substitute staff, so that all employees know what is expected of them during a fire emergency. The elements needed in the written plan should be identified in coordination with the authority having jurisdiction.

The facility fire emergency response plan might be a module of a facility disaster plan that covers other emergencies.

The proper safeguarding of clients during a fire emergency requires prompt and effective response by the facility employees in accordance with the fire emergency response plan. Duties covered under the plan should be assigned by position rather than by employee name. Such assignment ensures that, in the absence of an employee, the duties of the position will be performed by a substitute or temporary employee assigned to the position. Temporary or substitute employees should be instructed in advance regarding their duties under the plan for the position to which they are assigned.

Written fire emergency response plans should include, but should not be limited to, information for employees about methods and devices available for alerting occupants of a fire emergency. Employees should know how the fire department is to be alerted. Even where automatic systems are expected to alert the fire department, the written plan should provide for backup alerting procedures by staff. Other responses of employees to a fire emergency should include the following:

- (1) Removal of clients in immediate danger to areas of safety, as set forth in the plan
- (2) Methods of using building features to confine the fire and its byproducts to the room or area of origin
- (3) The control of actions and behaviors of clients during removal or evacuation activities and at predetermined safe assembly areas

The written plan should state clearly the facility policy regarding the actions staff are to take or not take to extinguish a fire.

The written fire emergency response plan should incorporate the emergency egress and relocation drill procedures set forth in 17.7.2.

A.17.7.2.1 The requirements are, of necessity, general in scope, as it is recognized that they apply to all types of day-care occupancies as well as conditions of occupancies, such as truant day-care occupancies; day-care occupancies for the mentally handicapped, vision impaired, hearing impaired, and speech impaired. It is fully recognized that no one code can meet all the conditions of the various buildings involved, and it will be necessary for site administrators to issue supplements to these requirements, but all supplements should be consistent with these requirements.

A.17.7.3.2 Particular attention should be given to keeping all doors unlocked; keeping doors that serve to protect the safety of paths of egress closed and under no conditions blocked open, such as doors on stairway enclosures; keeping outside stairs and fire escape stairs free from all obstructions and clear of snow and ice; and allowing no accumulation of snow or ice or materials of any kind outside exit doors that might prevent the opening of the door or interfere with rapid escape from the building.

A.17.7.5 It is the intent that the requirement for adequate adult staff to be awake at all times when clients are present be applied to family day-care and group day-care homes that are operated at night, as well as day-care occupancies.

CHAPTER 18

A.18.1.1.1.1(4) Exception In determining equivalency for conversions, modernizations, renovations, or unusual design concepts of hospitals or nursing homes, the authority having jurisdiction is permitted to accept evaluations based on Chapter 3 of NFPA 101A, *Guide on Alternative Approaches to Life Safety*, utilizing the parameters for new construction.

A.18.1.1.1.8 The *Code* recognizes that certain functions necessary for the life safety of building occupants, such as the closing of corridor doors, the operation of manual fire alarm devices, and the removal of patients from the room of fire origin, require the intervention of facility staff. It is not the intent of 18.1.1.1.8 to specify the levels or locations of staff necessary to meet this requirement.

A.18.1.1.2 This objective is accomplished in the context of the physical facilities, the type of activities undertaken, the provisions for the capabilities of staff, and the needs of all occupants through requirements directed at the following:

- (1) Prevention of ignition
- (2) Detection of fire
- (3) Control of fire development
- (4) Confinement of the effects of fire
- (5) Extinguishment of fire
- (6) Provision of refuge or evacuation facilities, or both
- (7) Staff reaction

A.18.1.1.4.5 The *Code* does not attempt to establish specific monetary limits or percentage values to determine whether a project is major or minor, as such a determination requires judgment. It is not the intent of 18.1.1.4.5 to exempt significant renovations and modernization projects for which the *Code* does intend to apply the automatic sprinkler mandate.

For the purpose of this requirement, a floor that is not divided by a smoke barrier is considered one smoke compartment.

A.18.1.2.1 Doctors' offices and treatment and diagnostic facilities intended solely for outpatient care that are physically separated from facilities for the treatment or care of inpatients, but that are otherwise associated with the management of an institution, might be classified as business occupancies rather than health care occupancies.

A.18.1.2.2 It is the intent that these requirements apply to mobile, transportable, and relocatable structures (in accordance with 1.4.2) where such structures are used to provide shared medical services on an extended or a temporary basis. Where properly separated from the health care occupancy and intended to provide services simultaneously for three or fewer health care patients who are litterborne, the level of protection for such structures should be based on the appropriate

occupancy classification of other chapters of this *Code*. Mobile, transportable, or relocatable structures that are not separated from a contiguous health care occupancy or that are intended to provide services simultaneously for four or more health care patients who are litterborne should be classified and designed as health care occupancies.

A.18.2.2 In planning egress, arrangements should be made to transfer patients from one section of a floor to another section of the same floor that is separated by a fire barrier or smoke barrier in such a manner that patients confined to their beds can be transferred in their beds. Where the building design will allow, the section of the corridor containing an entrance or elevator lobby should be separated from corridors leading from it by fire or smoke barriers. Such arrangement, where the lobby is centrally located, will, in effect, produce a smoke lock, placing a double barrier between the area to which patients might be taken and the area from which they need to be evacuated because of threatening smoke and fire.

A.18.2.2.2.4 Exception No. 2 The intent of the provision is that a person following the natural path of the means of egress not encounter more than one delayed release device along that path of travel to an exit. Thus, each door from the multiple floors of a building that opens into an enclosed stair is permitted to have its own delayed release device, but an additional delayed release device is not permitted at the level of exit discharge on the door that discharges people from the enclosed stair to the outside.

A.18.2.2.2.6 It is desirable to keep doors in exit passageways, stair enclosures, horizontal exits, smoke barriers, and required enclosures around hazardous areas closed at all times to impede the travel of smoke and fire gases. Functionally, however, this involves decreased efficiency and limits patient observation by the staff of an institution. To accommodate such needs, it is practical to presume that such doors will be kept open, even to the extent of employing wood chocks and other makeshift devices. Doors in exit passageways, horizontal exits, and smoke barriers should, therefore, be equipped with automatic hold-open devices activated by the methods described, regardless of whether the original installation of the doors was predicated on a policy of keeping them closed.

A.18.2.3.3 It is not the intent that the required corridor width be maintained clear and unobstructed at all times. Projections into the required width are permitted by the exception to 7.3.2. It is not the intent that 18.2.3.3 supersede 7.3.2. Also, it is recognized that wheeled items in use (such as food service carts, housekeeping carts, gurneys, beds, and similar items) and wheeled crash carts not in use (because they need to be immediately accessible during a clinical emergency) are encountered in health care occupancy corridors. The health care occupancy's fire plan and training program should address the relocation of these items during a fire. Note that "not in use" is not the same as "in storage." Storage is not permitted to be open to the corridor unless it meets one of the exceptions to 18.3.6.1 and is not a hazardous area.

A.18.2.3.3 Exception No. 1 Occupant characteristics are an important factor to be evaluated in setting egress criteria. Egress components in nonpatient use areas, such as administrative office spaces, should be evaluated based on actual use. A clear corridor width of not less than 44 in. (112 cm) is specified, assuming occupants in nonpatient areas will be mobile and capable of evacuation without assistance.

A.18.2.3.3 Exception No. 2 Exit access should be arranged to avoid any obstructions to the convenient removal of nonambulatory persons carried on stretchers or on mattresses serving as stretchers.

A.18.2.3.4 Exception No. 1 See A.18.2.3.3, Exception No. 1.

A.18.2.3.4 Exception No. 2 See A.18.2.3.3, Exception No. 2.

A.18.2.4.3 An exit is not necessary for each individual smoke compartment if there is access to an exit through other smoke compartments without passing through the smoke compartment of fire origin.

A.18.3.2.1 Provisions for the enclosure of rooms used for charging linen chutes and waste chutes or for rooms into which these chutes empty are provided in Chapter 9.

A.18.3.2.2 The hazard level of a laboratory is considered severe if quantities of flammable, combustible, or hazardous materials are present that are capable of sustaining a fire of sufficient magnitude to breach a 1-hour fire separation. See the NFPA *Fire Protection Handbook* for guidance.

A.18.3.2.6 Exception This exception is intended to permit small appliances used for reheating, such as microwave ovens, hot plates, toasters, and nourishment centers to be exempt from the requirements for commercial cooking equipment.

A.18.3.4.2 It is not the intent of this *Code* to require single-station smoke detectors that might be required by local codes to be connected to or to initiate the building fire alarm system.

A.18.3.4.3.1 Exception It is the intent of this exception to permit a visible fire alarm signal instead of an audible signal to reduce interference between the fire alarm and medical equipment monitoring alarms.

A.18.3.4.5.3 The requirement for smoke detectors in spaces open to the corridors eliminates the requirement contained in 18.3.6.1 for direct supervision by the facility staff of nursing homes.

A.18.3.5.1 In areas where the replenishment of water supplies is not immediately available from on-site sources, alternate provisions for the water-fill rate requirements of NFPA 13, *Standard for the Installation of Sprinkler Systems*, and NFPA 22, *Standard for Water Tanks for Private Fire Protection*, that are acceptable to the authority having jurisdiction should be provided. Appropriate means for the replenishment of these supplies from other sources, such as fire department tankers, public safety organizations, or other independent contractors should be incorporated into the overall fire safety plan of the facility.

With automatic sprinkler protection required throughout new health care facilities and quick-response sprinklers required in smoke compartments containing patient sleeping rooms, a fire and its life-threatening byproducts can be reduced, thereby allowing the defend-in-place concept to continue. The difficulty in maintaining the proper integrity of life safety elements has been considered and it has been judged that the probability of a sprinkler system operating as designed is equal to or greater than other life safety features.

A.18.3.5.2 The requirements for use of quick-response sprinklers intend that quick-response sprinklers be the predominant type of sprinkler installed in the smoke compartment. It is recognized, however, that quick-response sprinklers might not be approved for installation in all areas such as those where NFPA 13, *Standard for the Installation of Sprinkler Systems*,

requires sprinklers of the intermediate- or high-temperature classification. It is not the intent of the 18.3.5.2 requirements to prohibit the use of standard sprinklers in limited areas of a smoke compartment where intermediate- or high-temperature sprinklers are required.

Where the installation of quick-response sprinklers is impracticable in patient sleeping room areas, appropriate equivalent protection features acceptable to the authority having jurisdiction should be provided. It is recognized that the use of quick-response sprinklers might be limited in facilities housing certain types of patients or by the installation limitations of quick-response sprinklers.

A.18.3.5.5 For the proper operation of sprinkler systems, cubicle curtains and sprinkler locations need to be coordinated. Improperly designed systems might obstruct the sprinkler spray from reaching the fire or might shield the heat from the sprinkler. Many options are available to the designer including, but not limited to, hanging the cubicle curtains 18 in. (46 cm) below the sprinkler deflector; using a 1/2-in. (1.3-cm) diagonal mesh or a 70 percent open weave top panel that extends 18 in. (46 cm) below the sprinkler deflector; or designing the system to have a horizontal and minimum vertical distance that meets the requirements of NFPA 13, *Standard for the Installation of Sprinkler Systems*. The test data that forms the basis of the NFPA 13 requirements is from fire tests with sprinkler discharge that penetrated a single privacy curtain.

A.18.3.6.1 Exception No. 3 A typical nurses' station would normally contain one or more of the following with associated furniture and furnishings:

- (1) Charting area
- (2) Clerical area
- (3) Nourishment station
- (4) Storage of small amounts of medications, medical equipment and supplies, clerical supplies, and linens
- (5) Patient monitoring and communication equipment

A.18.3.6.2 It is the *Code's* intent that there be no required fire resistance nor area limitations for vision panels in corridor walls and doors.

An architectural, exposed, suspended-grid acoustical tile ceiling with penetrating items such as sprinkler piping and sprinklers; ducted HVAC supply and return-air diffusers; speakers; and recessed lighting fixtures is capable of limiting the transfer of smoke.

A.18.3.6.3 While it is recognized that closed doors serve to maintain tenable conditions in a corridor and adjacent patient rooms, such doors, which under normal or fire conditions are self-closing, might create a special hazard for the personal safety of a room occupant. These closed doors might present a problem of delay in discovery, confining fire products beyond tenable conditions.

Because it is critical for responding staff members to be able to immediately identify the specific room involved, it is suggested that approved automatic smoke detection that is interconnected with the building fire alarm be considered for rooms having doors equipped with closing devices. Such detection is permitted to be located at any approved point within the room. When activated, the detector is required to provide a warning that indicates the specific room of involvement by activation of a fire alarm annunciator, nurse call system, or any other device acceptable to the authority having jurisdiction.

A.18.3.6.3.1 Gasketing of doors should not be necessary to achieve resistance to the passage of smoke if the door is relatively tight-fitting.

A.18.3.6.3.3 Doors should not be blocked open by furniture, door stops, chocks, tie-backs, drop-down or plunger-type devices, or other devices that necessitate manual unlatching or releasing action to close. Examples of hold-open devices that release when the door is pushed or pulled are friction catches or magnetic catches.

A.18.3.7 See A.18.2.2.

A.18.3.7.3 Exception No. 2 Where the smoke control system design requires dampers in order that the system functions effectively, it is not the intent of the exception to permit the damper to be omitted.

This exception is not intended to prevent the use of plenum returns where ducting is used to return air from a ceiling plenum through smoke barrier walls. Short stubs or jumper ducts are not acceptable. Ducting is required to connect at both sides of the opening and to extend into adjacent spaces away from the wall. The intent is to prohibit open-air transfers at or near the smoke barrier walls.

A.18.3.7.5 Smoke partition doors are intended to provide access to adjacent zones. The pair of cross-corridor doors are required to be opposite swinging. Access to both zones is required.

A.18.3.7.6 Smoke barriers might include walls having door openings other than cross-corridor doors. There is no restriction in the *Code* regarding which doors or how many doors form part of a smoke barrier. For example, doors from the corridor to individual rooms are permitted to form part of a smoke barrier.

A.18.3.7.7 It is not the intent to require the frame to be a listed assembly.

A.18.3.8 Individual sleeping cubicles within sleeping suites, as permitted by 18.2.5.3, are not required to have an outside window or outside door in each cubicle, provided that not less than one outside window or outside door is provided in the suite or that the requirements of 18.3.8, Exception No. 3, are met.

A.18.5.2.2 For both new and existing buildings, it is the intent to permit the installation and use of fireplace stoves and room heaters utilizing solid fuel as defined in NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances*, provided that all such devices are installed, maintained, and used in accordance with the appropriate provisions of that standard and all manufacturers' specifications. These requirements are not intended to permit freestanding solid fuel-burning appliances such as freestanding wood-burning stoves.

A.18.7 Health care occupants have, in large part, varied degrees of physical disability, and their removal to the outside or even their disturbance caused by moving is inexpedient or impractical in many cases, except as a last resort. Similarly, recognizing that there might be an operating necessity for the restraint of the mentally ill, often by use of barred windows and locked doors, fire exit drills are usually extremely disturbing, detrimental, and frequently impracticable.

In most cases, fire exit drills, as ordinarily practiced in other occupancies, cannot be conducted in health care occupancies. Fundamentally, superior construction, early discovery and extinguishment of incipient fires, and prompt notification

need to be relied on to reduce the occasion for evacuation of buildings of this class to a minimum.

A.18.7.1.2 Many health care occupancies conduct fire drills without disturbing patients by choosing the location of the simulated emergency in advance and by closing the doors to patients' rooms or wards in the vicinity prior to initiation of the drill. The purpose of a fire drill is to test and evaluate the efficiency, knowledge, and response of institutional personnel in implementing the facility fire emergency plan. Its purpose is not to disturb or excite patients. Fire drills should be scheduled on a random basis to ensure that personnel in health care facilities are drilled not less than once in each 3-month period.

Drills should consider the ability to move patients to an adjacent smoke compartment. Relocation can be practiced using simulated patients or empty wheelchairs.

A.18.7.2.1 Each facility has specific characteristics that vary sufficiently from other facilities to prevent the specification of a universal emergency procedure. The following recommendations, however, contain many of the elements that should be considered and adapted as appropriate to the individual facility.

Upon discovery of fire, personnel should immediately take the following action.

(a) If any person is involved in the fire, the discoverer should go to the aid of that person, calling aloud an established code phrase. The use of a code provides for both the immediate aid of any endangered person and the transmission of an alarm. Any person in the area, upon hearing the code called aloud, should activate the building fire alarm using the nearest manual fire alarm box.

(b) If a person is not involved in the fire, the discoverer should activate the building fire alarm using the nearest manual fire alarm box.

(c) Personnel, upon hearing the alarm signal, should immediately execute their duties as outlined in the facility fire safety plan.

(d) The telephone operator should determine the location of the fire as indicated by the audible signal. In a building equipped with an uncoded alarm system, a person on the floor of fire origin should be responsible for promptly notifying the facility telephone operator of the fire location.

(e) If the telephone operator receives a telephone alarm reporting a fire from a floor, the operator should regard that alarm in the same fashion as an alarm received over the fire alarm system. The operator should immediately notify the fire department and alert all facility personnel of the place of fire and its origin.

(f) If the building fire alarm system is out of order, any person discovering a fire should immediately notify the telephone operator by telephone. The operator should then transmit this information to the fire department and alert the building occupants.

A.18.7.4 The most rigid discipline with regard to prohibition of smoking might not be nearly as effective in reducing incipient fires from surreptitious smoking as the open recognition of smoking, with provision of suitable facilities for smoking. Proper education and training of the staff and attendants in the ordinary fire hazards and their abatement is unquestionably essential. The problem is a broad one, varying with different types and arrangements of buildings; the effectiveness of rules of procedure, which need to be flexible, depends in large part on the management.

A.18.7.5.1 In addition to the provisions of 10.3.1, which deal with ignition resistance, additional requirements with respect to the location of cubicle curtains relative to sprinkler placement are included in NFPA 13, *Standard for the Installation of Sprinkler Systems*.

A.18.7.7 Two documents that provide recognized engineering principles for the testing of smoke control systems are NFPA 92A, *Recommended Practice for Smoke-Control Systems*, and NFPA 92B, *Guide for Smoke Management Systems in Malls, Atria, and Large Areas*.

CHAPTER 19

A.19.1.1.1.1 Exception In determining equivalency for existing hospitals or nursing homes, the authority having jurisdiction is permitted to accept evaluations based on Chapter 3 of NFPA 101A, *Guide on Alternative Approaches to Life Safety*, utilizing the parameters for existing buildings.

A.19.1.1.1.8 The *Code* recognizes that certain functions necessary for the life safety of building occupants, such as the closing of corridor doors, the operation of manual fire alarm devices, and the removal of patients from the room of fire origin, require the intervention of facility staff. It is not the intent of 19.1.1.1.8 to specify the levels or locations of staff necessary to meet this requirement.

A.19.1.1.2 This objective is accomplished in the context of the physical facilities, the type of activities undertaken, the provisions for the capabilities of staff, and the needs of all occupants through requirements directed at the following:

- (1) Prevention of ignition
- (2) Detection of fire
- (3) Control of fire development
- (4) Confinement of the effects of fire
- (5) Extinguishment of fire
- (6) Provision of refuge or evacuation facilities, or both
- (7) Staff reaction

A.19.1.1.4.5 The *Code* does not attempt to establish specific monetary limits or percentage values to determine whether a project is major or minor, as such a determination requires judgment. It is not the intent of 19.1.1.4.5 to exempt significant renovations and modernization projects for which the *Code* does intend to apply the automatic sprinkler mandate.

For the purpose of this requirement, a floor that is not divided by a smoke barrier is considered one smoke compartment.

A.19.1.2.1 Doctors' offices and treatment and diagnostic facilities intended solely for outpatient care that are physically separated from facilities for the treatment or care of inpatients, but that are otherwise associated with the management of an institution, might be classified as business occupancies rather than health care occupancies.

A.19.1.2.2 It is the intent that these requirements apply to mobile, transportable, and relocatable structures (in accordance with 1.4.2) when such structures are used to provide shared medical services on an extended or a temporary basis. When properly separated from the health care occupancy and intended to provide services simultaneously for three or fewer health care patients who are litterborne, the level of protection for such structures should be based on the appropriate occupancy classification of other chapters of this *Code*. Mobile, transportable, or relocatable structures that are not separated from a contiguous health care occupancy or that are intended to provide services simultaneously for four or more health

care patients who are litterborne should be classified and designed as health care occupancies.

A.19.1.6.2 Exception Unoccupied space, for the purposes of this exception, is space not normally occupied by persons, fuel-fired equipment, or hazardous contents.

A.19.1.6.3 Exception There is a finish capacity in a 1-hour fire-rated partition that would be expected to prevent the generation of smoke and gases from fire retardant-treated wood studs for an extended time during fire exposure. This *Code* does not intend to permit the use of fire-retardant wood studs and partitions of only 20-minute fire resistance.

A.19.2.2.2.4 Exception No. 2 The intent of the provision is that a person following the natural path of the means of egress not encounter more than one delayed release device along that path of travel to an exit. Thus, each door from the multiple floors of a building that opens into an enclosed stair is permitted to have its own delayed release device, but an additional delayed release device is not permitted at the level of exit discharge on the door that discharges people from the enclosed stair to the outside.

A.19.2.2.2.6 It is desirable to keep doors in exit passageways, stair enclosures, horizontal exits, smoke barriers, and required enclosures around hazardous areas closed at all times to impede the travel of smoke and fire gases. Functionally, however, this involves decreased efficiency and limits patient supervision by the staff of a facility. To accommodate such needs, it is practical to presume that such doors will be kept open, even to the extent of employing wood chocks and other makeshift devices. Doors in exit passageways, horizontal exits, and smoke barriers should, therefore, be equipped with automatic hold-open devices actuated by the methods described regardless of whether the original installation of the doors was predicated on a policy of keeping them closed.

A.19.2.2.2.8 Doors to the enclosures of interior stair exits should be arranged to open from the stair side at not less than every third floor so that it will be possible to leave the stairway at such floor if fire renders the lower part of the stair unusable during egress or if occupants seek refuge on another floor.

A.19.2.2.5.3 The waiver of the requirement for doors to swing in the direction of egress travel is based on the assumption that, in this occupancy, there is no possibility of a panic rush that might prevent the opening of doors that swing against egress travel.

A desirable arrangement, which is possible with corridors 8 ft (2.4 m) or more in width, is to have two 42-in. (107-cm) doors, normally closed, each swinging with the egress travel (in opposite directions).

A.19.2.3.3 It is not the intent that the required corridor width be maintained clear and unobstructed at all times. Projections into the required width are permitted by the exception to 7.3.2. It is not the intent that 19.2.3.3 supersede 7.3.2. Also, it is recognized that wheeled items in use (such as food service carts, housekeeping carts, gurneys, beds, and similar items) and wheeled crash carts not in use (because they need to be immediately accessible during a clinical emergency) are encountered in health care occupancy corridors. The health care occupancy's fire plan and training program should address the relocation of these items during a fire. Note that "not in use" is not the same as "in storage." Storage is not permitted to be open to the corridor unless it meets one of the exceptions to 19.3.6.1 and is not a hazardous area.

A.19.2.4.3 An exit is not necessary for each individual smoke compartment if there is access to an exit through other smoke compartments without passing through the smoke compartment of fire origin.

A.19.2.5.9 Every exit or exit access should be arranged, if practical and feasible, so that no corridor, passageway, or aisle has a pocket or dead end exceeding 30 ft (9.1 m). (See also Table A.7.6.1.)

A.19.3.2.2 The hazard level of a laboratory is considered severe if quantities of flammable, combustible, or hazardous materials are present that are capable of sustaining a fire of sufficient magnitude to breach a 1-hour fire separation. See NFPA *Fire Protection Handbook* for guidance.

A.19.3.2.6 Exception This exception is intended to permit small appliances used for reheating, such as microwave ovens, hot plates, toasters, and nourishment centers, to be exempt from the requirements for commercial cooking equipment.

A.19.3.4.2 It is not the intent of this *Code* to require single-station smoke detectors, which might be required by local codes, to be connected to or to initiate the building fire alarm system.

A.19.3.4.3.1 Exception No. 1 It is the intent of this exception to permit a visible fire alarm signal instead of an audible signal to reduce interference between the fire alarm and medical equipment monitoring alarms.

A.19.3.5.2 It is intended that any valve that controls automatic sprinklers in the entire building or portions of the building, including sectional and floor control valves, be electrically supervised. Valves that control isolated sprinkler heads, such as in laundry and trash chutes, are not required to be electrically supervised. Appropriate means should be taken to ensure that valves that are not electrically supervised remain open.

A.19.3.5.3 The exceptions to 19.3.5.3 are not intended to supplant NFPA 13, *Standard for the Installation of Sprinkler Systems*, which requires that residential sprinklers with more than a 10°F (5.6°C) difference in temperature rating not be mixed within a room. Currently there are no additional prohibitions in NFPA 13 on the mixing of sprinklers having different thermal response characteristics. Conversely, there are no design parameters to make practical the mixing of residential and other types of sprinklers.

A.19.3.5.5 For the proper operation of sprinkler systems, cubicle curtains and sprinkler locations need to be coordinated. Improperly designed systems might obstruct the sprinkler spray from reaching the fire or might shield the heat from the sprinkler. Many options are available to the designer including, but not limited to, hanging the cubicle curtains 18 in. (46 cm) below the sprinkler deflector; using 1/2-in. (1.3-cm) diagonal mesh or a 70 percent open weave top panel that extends 18 in. (46 cm) below the sprinkler deflector; or designing the system to have a horizontal and minimum vertical distance that meets the requirements of NFPA 13, *Standard for the Installation of Sprinkler Systems*. The test data that forms the basis of the NFPA 13 requirements is from fire tests with sprinkler discharge that penetrated a single privacy curtain.

A.19.3.6.1 Exception No. 3 A typical nurses' station would normally contain one or more of the following with associated furniture and furnishings:

- (1) Charting area
- (2) Clerical area
- (3) Nourishment station

- (4) Storage of small amounts of medications, medical equipment and supplies, clerical supplies, and linens
- (5) Patient monitoring and communication equipment

A.19.3.6.1 Exception No. 6(b) A fully developed fire (flashover) occurs if the rate of heat release of the burning materials exceeds the capability of the space to absorb or vent that heat. The ability of common lining (wall, ceiling, and floor) materials to absorb heat is approximately 0.75 Btu (0.79 kJ) per ft² of lining. The venting capability of open doors or windows is in excess of 20 Btu (21 kJ) per ft² of opening. In a fire that has not reached flashover conditions, fire will spread from one furniture item to another only if the burning item is close to another furniture item. For example, if individual furniture items have heat release rates of 500 Btu per second (525 kW) and are separated by 12 in. (30.5 cm) or more, the fire is not expected to spread from item to item, and flashover is unlikely to occur. (See also the NFPA *Fire Protection Handbook*.)

A.19.3.6.1 Exception No. 7 This exception permits waiting areas to be located across the corridor from each other, provided that neither area exceeds the 600-ft² (55.7-m²) limitation.

A.19.3.6.2.1 The intent of the 1/2-hour fire resistance rating for corridor partitions is to require a nominal fire rating, particularly where the fire rating of existing partitions cannot be documented. Examples of acceptable partition assemblies would include, but are not limited to, 1/2-in. (1.3-cm) gypsum board, wood lath and plaster, gypsum lath, or metal lath and plaster.

A.19.3.6.2.1 Exception No. 1 An architectural, exposed, suspended-grid acoustical tile ceiling with penetrating items such as sprinkler piping and sprinklers; ducted HVAC supply and return-air diffusers; speakers; and recessed lighting fixtures is capable of limiting the transfer of smoke.

A.19.3.6.2.1 Exception No. 3 Monolithic ceilings are continuous horizontal membranes composed of noncombustible or limited-combustible materials, such as plaster or gypsum board, with seams or cracks permanently sealed.

A.19.3.6.2.2 The purpose of extending a corridor wall above a lay-in ceiling or through a concealed space is to provide a barrier to limit the passage of smoke. The intent of 19.3.6.2.2 is not to require light-tight barriers above lay-in ceilings or to require an absolute seal of the room from the corridor. Small holes, penetrations or gaps around items such as ductwork, conduit, or telecommunication lines should not affect the ability of this barrier to limit the passage of smoke.

A.19.3.6.3.1 Gasketing of doors should not be necessary to achieve resistance to the passage of smoke if the door is relatively tight-fitting.

A.19.3.6.3.2 While it is recognized that closed doors serve to maintain tenable conditions in a corridor and adjacent patient rooms, such doors, which under normal or fire conditions are self-closing, might create a special hazard for the personal safety of a room occupant. These closed doors might present a problem of delay in discovery, confining fire products beyond tenable conditions.

Since it is critical for responding staff members to be able to immediately identify the specific room involved, it is suggested that approved automatic smoke detection that is interconnected with the building fire alarm be considered for rooms having doors equipped with closing devices. Such detection is permitted to be located at any approved point

within the room. When activated, the detector is required to provide a warning that indicates the specific room of involvement by activation of a fire alarm annunciator, nurse call system, or any other device acceptable to the authority having jurisdiction.

In existing buildings, use of the following options reasonably ensures that patient room doors will be closed and remain closed during a fire:

- (1) Doors should have positive latches and a suitable program that trains staff to close the doors in an emergency should be established.
- (2) It is the intent of the *Code* that no new installations of roller latches be permitted, however, repair or replacement of roller latches is not considered a new installation.
- (3) Doors protecting openings to patient sleeping or treatment rooms, or spaces having a similar combustible loading might be held closed using a closer exerting a closing force of not less than 5 lbf (22 N) on the door latch stile.

A.19.3.6.3.3 Doors should not be blocked open by furniture, door stops, chocks, tie-backs, drop-down or plunger-type devices, or other devices that necessitate manual unlatching or releasing action to close. Examples of hold-open devices that release when the door is pushed or pulled are friction catches or magnetic catches.

A.19.3.7.3 Exception No. 2 Where the smoke control system design requires dampers in order that the system functions effectively, it is not the intent of the exception to permit the damper to be omitted.

This exception is not intended to prevent the use of plenum returns where ducting is used to return air from a ceiling plenum through smoke barrier walls. Short stubs or jumper ducts are not acceptable. Ducting is required to connect at both sides of the opening and to extend into adjacent spaces away from the wall. The intent is to prohibit open-air transfers at or near the smoke barrier walls.

A.19.3.7.6 Smoke barriers might include walls having door openings other than cross-corridor doors. There is no restriction in the *Code* regarding which doors or how many doors form part of a smoke barrier. For example, doors from the corridor to individual rooms are permitted to form part of a smoke barrier.

A.19.5.2.2 For both new and existing buildings, it is the intent to permit the installation and use of fireplace stoves and room heaters using solid fuel as defined in NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances*, provided that all such devices are installed, maintained, and used in accordance with the appropriate provisions of that standard and all manufacturers' specifications. These requirements are not intended to permit freestanding solid fuel-burning appliances such as freestanding wood-burning stoves.

A.19.7 Health care occupants have, in large part, varied degrees of physical disability, and their removal to the outside or even their disturbance caused by moving is inexpedient or impractical in many cases, except as a last resort. Similarly, recognizing that there might be an operating necessity for the restraint of the mentally ill, often by use of barred windows and locked doors, fire exit drills are usually extremely disturbing, detrimental, and frequently impracticable.

In most cases, fire exit drills, as ordinarily practiced in other occupancies, cannot be conducted in health care occupancies. Fundamentally, superior construction, early discov-

ery and extinguishment of incipient fires, and prompt notification needs to be relied on to reduce the occasion for evacuation of buildings of this class to a minimum.

A.19.7.1.2 Many health care occupancies conduct fire drills without disturbing patients by choosing the location of the simulated emergency in advance and by closing the doors to patients' rooms or wards in the vicinity prior to initiation of the drill. The purpose of a fire drill is to test and evaluate the efficiency, knowledge, and response of institutional personnel in implementing the facility fire emergency plan. Its purpose is not to disturb or excite patients. Fire drills should be scheduled on a random basis to ensure that personnel in health care facilities are drilled not less than once in each 3-month period.

Drills should consider the ability to move patients to an adjacent smoke compartment. Relocation can be practiced using simulated patients or empty wheelchairs.

A.19.7.2.1 Each facility has specific characteristics that vary sufficiently from other facilities to prevent the specification of a universal emergency procedure. The following recommendations, however, contain many of the elements that should be considered and adapted as appropriate to the individual facility.

Upon discovery of fire, personnel should immediately take the following action.

(a) If any person is involved in the fire, the discoverer should go to the aid of that person, calling aloud an established code phrase. The use of a code provides for both the immediate aid of any endangered person and the transmission of an alarm. Any person in the area, upon hearing the code called aloud, should activate the building fire alarm using the nearest manual fire alarm box.

(b) If a person is not involved in the fire, the discoverer should activate the building fire alarm using the nearest manual fire alarm box.

(c) Personnel, upon hearing the alarm signal, should immediately execute their duties as outlined in the facility fire safety plan.

(d) The telephone operator should determine the location of the fire as indicated by the audible signal. In a building equipped with an uncoded alarm system, a person on the floor of fire origin should be responsible for promptly notifying the facility telephone operator of the fire location.

(e) If the telephone operator receives a telephone alarm reporting a fire from a floor, the operator should regard that alarm in the same fashion as an alarm received over the fire alarm system. The operator should immediately notify the fire department and alert all facility personnel of the place of fire and its origin.

(f) If the building fire alarm system is out of order, any person discovering a fire should immediately notify the telephone operator by telephone. The operator should then transmit this information to the fire department and alert the building occupants.

A.19.7.4 The most rigid discipline with regard to prohibition of smoking might not be nearly as effective in reducing incipient fires from surreptitious smoking as the open recognition of smoking, with provision of suitable facilities for smoking. Proper education and training of the staff and attendants in the ordinary fire hazards and their abatement is unquestionably essential. The problem is a broad one, varying with different types and arrangements of buildings; the effectiveness of rules of procedure, which need to be flexible, depends in large part on the management.

A.19.7.5.1 In addition to the provisions of 10.3.1, which deal with ignition resistance, additional requirements with respect to the location of cubicle curtains relative to sprinkler placement are included in NFPA 13, *Standard for the Installation of Sprinkler Systems*.

A.19.7.7 Two documents that provide recognized engineering principles for the testing of smoke control systems are NFPA 92A, *Recommended Practice for Smoke-Control Systems*, and NFPA 92B, *Guide for Smoke Management Systems in Malls, Atria, and Large Areas*.

CHAPTER 20

A.20.1.1.1.6 The *Code* recognizes that certain functions necessary for the life safety of building occupants, such as the closing of corridor doors, the operation of manual fire alarm devices, and the removal of patients from the room of fire origin, require the intervention of facility staff. It is not the intent of 20.1.1.1.6 to specify the levels or locations of staff necessary to meet this requirement.

A.20.1.1.2 This objective is accomplished in the context of the physical facilities, the type of activities undertaken, the provisions for the capabilities of staff, and the needs of all occupants through requirements directed at the following:

- (1) Prevention of ignition
- (2) Detection of fire
- (3) Control of fire development
- (4) Confinement of the effects of fire
- (5) Extinguishment of fire
- (6) Provision of refuge or evacuation facilities, or both
- (7) Staff reaction

A.20.1.2.1 Doctors' offices and treatment and diagnostic facilities intended solely for outpatient care that are physically separated from facilities for the treatment or care of inpatients, but that are otherwise associated with the management of an institution, might be classified as business occupancies rather than health care occupancies.

A.20.3.7.6 Smoke barriers might include walls having door openings other than cross-corridor doors. There is no restriction in the *Code* regarding which doors or how many doors form part of a smoke barrier. For example, doors from the corridor to individual rooms are permitted to form part of a smoke barrier.

A.20.7 Health care occupants have, in large part, varied degrees of physical disability, and their removal to the outside or even their disturbance caused by moving is inexpedient or impractical in many cases, except as a last resort. Similarly, recognizing that there might be an operating necessity for the restraint of the mentally ill, often by use of barred windows and locked doors, fire exit drills are usually extremely disturbing, detrimental, and frequently impracticable.

In most cases, fire exit drills, as ordinarily practiced in other occupancies, cannot be conducted in health care occupancies. Fundamentally, superior construction, early discovery and extinguishment of incipient fires, and prompt notification need to be relied on to reduce the occasion for evacuation of buildings of this class to a minimum.

A.20.7.1.2 Many health care occupancies conduct fire drills without disturbing patients by choosing the location of the simulated emergency in advance and by closing the doors to patients' rooms or wards in the vicinity prior to the initiation of the drill. The purpose of a fire drill is to test and evaluate

the efficiency, knowledge, and response of institutional personnel in implementing the facility fire emergency plan. Its purpose is not to disturb or excite patients. Fire drills should be scheduled on a random basis to ensure that personnel in health care facilities are drilled not less than once in each 3-month period.

Drills should consider the ability to move patients to an adjacent smoke compartment. Relocation can be practiced using simulated patients or empty wheelchairs.

A.20.7.2.1 Each facility has specific characteristics that vary sufficiently from other facilities to prevent the specification of a universal emergency procedure. The following recommendations, however, contain many of the elements that should be considered and adapted as appropriate to the individual facility.

Upon discovery of fire, personnel should immediately take the following action.

(a) If any person is involved in the fire, the discoverer should go to the aid of that person, calling aloud an established code phrase. The use of a code provides for both the immediate aid of any endangered person and the transmission of an alarm. Any person in the area, upon hearing the code called aloud, should activate the building fire alarm using the nearest manual fire alarm box.

(b) If a person is not involved in the fire, the discoverer should activate the building fire alarm using the nearest manual fire alarm box.

(c) Personnel, upon hearing the alarm signal, should immediately execute their duties as outlined in the facility fire safety plan.

(d) The telephone operator should determine the location of the fire as indicated by the audible signal. In a building equipped with an uncoded alarm system, a person on the floor of fire origin should be responsible for promptly notifying the facility telephone operator of the fire location.

(e) If the telephone operator receives a telephone alarm reporting a fire from a floor, the operator should regard that alarm in the same fashion as an alarm received over the fire alarm system. The operator should immediately notify the fire department and alert all facility personnel of the place of fire and its origin.

(f) If the building fire alarm system is out of order, any person discovering a fire should immediately notify the telephone operator by telephone. The operator should then transmit this information to the fire department and alert the building occupants.

A.20.7.4 The most rigid discipline with regard to prohibition of smoking might not be nearly as effective in reducing incipient fires from surreptitious smoking as the open recognition of smoking, with provision of suitable facilities for smoking. Proper education and training of the staff and attendants in the ordinary fire hazards and their abatement is unquestionably essential. The problem is a broad one, varying with different types and arrangements of buildings; the effectiveness of rules of procedure, which need to be flexible, depends in large part on the management.

A.20.7.5.1 In addition to the provisions of 10.3.1, which deal with ignition resistance, additional requirements with respect to the location of cubicle curtains relative to sprinkler placement are included in NFPA 13, *Standard for the Installation of Sprinkler Systems*.

A.20.7.7 Two documents that provide recognized engineering principles for the testing of smoke control systems are

NFPA 92A, *Recommended Practice for Smoke-Control Systems*, and NFPA 92B, *Guide for Smoke Management Systems in Malls, Atria, and Large Areas*.

CHAPTER 21

A.21.1.1.1.6 The *Code* recognizes that certain functions necessary for the life safety of building occupants, such as the closing of corridor doors, the operation of manual fire alarm devices, and the removal of patients from the room of fire origin, require the intervention of facility staff. It is not the intent of 21.1.1.1.6 to specify the levels or locations of staff necessary to meet this requirement.

A.21.1.1.2 This objective is accomplished in the context of the physical facilities, the type of activities undertaken, the provisions for the capabilities of staff, and the needs of all occupants through requirements directed at the following:

- (1) Prevention of ignition
- (2) Detection of fire
- (3) Control of fire development
- (4) Confinement of the effects of fire
- (5) Extinguishment of fire
- (6) Provision of refuge or evacuation facilities, or both
- (7) Staff reaction

A.21.1.2.1 Doctors' offices and treatment and diagnostic facilities intended solely for outpatient care that are physically separated from facilities for the treatment or care of inpatients, but that are otherwise associated with the management of an institution, might be classified as business occupancies rather than health care occupancies.

A.21.3.7.6 Smoke barriers might include walls having door openings other than cross-corridor doors. There is no restriction in the *Code* regarding which doors or how many doors form part of a smoke barrier. For example, doors from the corridor to individual rooms are permitted to form part of a smoke barrier.

A.21.7 Health care occupants have, in large part, varied degrees of physical disability, and their removal to the outside or even their disturbance caused by moving is inexpedient or impractical in many cases, except as a last resort. Similarly, recognizing that there might be an operating necessity for the restraint of the mentally ill, often by use of barred windows and locked doors, fire exit drills are usually extremely disturbing, detrimental, and frequently impracticable.

In most cases, fire exit drills, as ordinarily practiced in other occupancies, cannot be conducted in health care occupancies. Fundamentally, superior construction, early discovery and extinguishment of incipient fires, and prompt notification needs to be relied on to reduce the occasion for evacuation of buildings of this class to a minimum.

A.21.7.1.2 Many health care occupancies conduct fire drills without disturbing patients by choosing the location of the simulated emergency in advance and by closing the doors to patients' rooms or wards in the vicinity prior to initiation of the drill. The purpose of a fire drill is to test and evaluate the efficiency, knowledge, and response of institutional personnel in implementing the facility fire emergency plan. Its purpose is not to disturb or excite patients. Fire drills should be scheduled on a random basis to ensure that personnel in health care facilities are drilled not less than once in each 3-month period.

Drills should consider the ability to move patients to an adjacent smoke compartment. Relocation can be practiced using simulated patients or empty wheelchairs.

A.21.7.2.1 Each facility has specific characteristics that vary sufficiently from other facilities to prevent the specification of a universal emergency procedure. The following recommendations, however, contain many of the elements that should be considered and adapted as appropriate to the individual facility.

Upon discovery of fire, personnel should immediately take the following action.

(a) If any person is involved in the fire, the discoverer should go to the aid of that person, calling aloud an established code phrase. The use of a code provides for both the immediate aid of any endangered person and the transmission of an alarm. Any person in the area, upon hearing the code called aloud, should activate the building fire alarm using the nearest manual fire alarm box.

(b) If a person is not involved in the fire, the discoverer should activate the building fire alarm using the nearest manual fire alarm box.

(c) Personnel, upon hearing the alarm signal, should immediately execute their duties as outlined in the facility fire safety plan.

(d) The telephone operator should determine the location of the fire as indicated by the audible signal. In a building equipped with an uncoded alarm system, a person on the floor of fire origin should be responsible for promptly notifying the facility telephone operator of the fire location.

(e) If the telephone operator receives a telephone alarm reporting a fire from a floor, the operator should regard that alarm in the same fashion as an alarm received over the fire alarm system. The operator should immediately notify the fire department and alert all facility personnel of the place of fire and its origin.

(f) If the building fire alarm system is out of order, any person discovering a fire should immediately notify the telephone operator by telephone. The operator should then transmit this information to the fire department and alert the building occupants.

A.21.7.4 The most rigid discipline with regard to prohibition of smoking might not be nearly as effective in reducing incipient fires from surreptitious smoking as the open recognition of smoking, with provision of suitable facilities for smoking. Proper education and training of the staff and attendants in the ordinary fire hazards and their abatement is unquestionably essential. The problem is a broad one, varying with different types and arrangements of buildings; the effectiveness of rules of procedure, which need to be flexible, depends in large part on the management.

A.21.7.5.1 In addition to the provisions of 10.3.1, which deal with ignition resistance, additional requirements with respect to the location of cubicle curtains relative to sprinkler placement are included in NFPA 13, *Standard for the Installation of Sprinkler Systems*.

A.21.7.7 Two documents that provide recognized engineering principles for the testing of smoke control systems are NFPA 92A, *Recommended Practice for Smoke-Control Systems*, and NFPA 92B, *Guide for Smoke Management Systems in Malls, Atria, and Large Areas*.

CHAPTER 22

A.22.1.1.2 Exception No. 2 In determining equivalency for conversions, modernizations, renovations, or unusual design concepts of detention and correctional facilities, the authority having jurisdiction is permitted to accept evaluations based on

Chapter 4 of NFPA 101A, *Guide on Alternative Approaches to Life Safety*, utilizing the parameters for new construction.

A.22.1.2 Detention and correctional facilities are a complex of structures, each serving a definite and usually different purpose. In many institutions, all, or almost all, the occupancy-type classifications found in this *Code* are represented. Means of egress and other features are governed by the type of occupancy classification and the hazard of occupancy, unless specific exceptions are made.

All buildings and structures are to be classified using Chapter 22 and Section 6.1 as a guide, subject to the ruling of the authority having jurisdiction where there is a question as to the proper classification of any individual building or structure.

Use condition classification of the institution, as well as individual areas within the complex, is always to be considered by the authority having jurisdiction.

A.22.1.2.1 Key-operated locking hardware should be of institutional grade. Lesser grade hardware might not be suitable for the heavy use that these locks are expected to receive.

A.22.1.4.1 Users and occupants of detention and correctional facilities at various times can be expected to include staff, visitors, and residents. The extent and nature of facility utilization will vary according to the type of facility, its function, and its programs.

Figure A.22.1.4.1 illustrates the five use conditions.

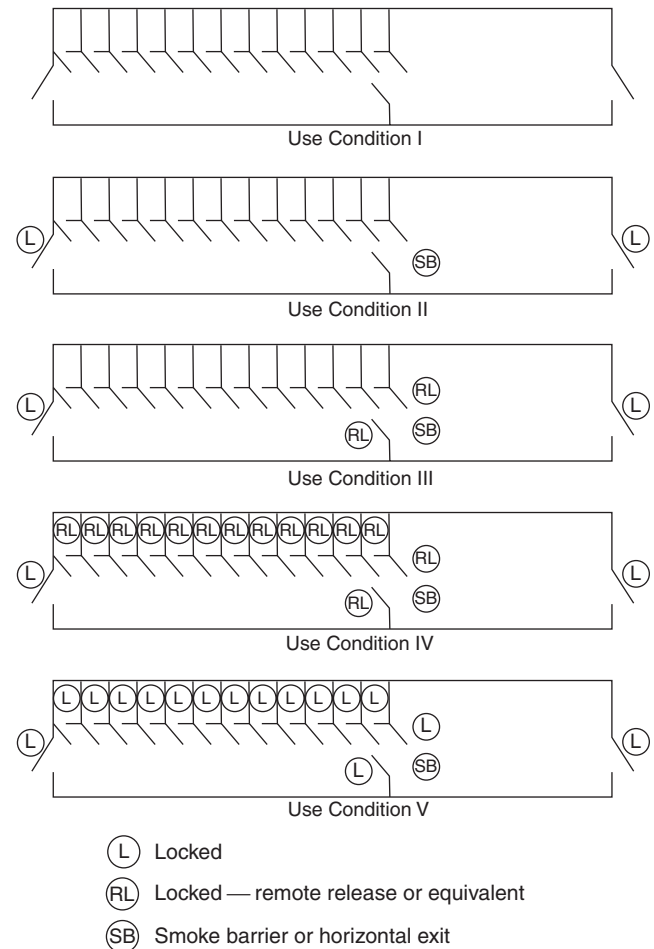
A.22.1.4.2 Prompt operation is intended to be accomplished in the period of time between detection of fire by either the smoke detector(s) required by 22.3.4 or by other means, whichever comes first, and the advent of intolerable conditions forcing emergency evacuation. Fire tests have indicated that the time available is a function of the volume and height of the space involved and the rate of fire development. In traditional single-story corridor arrangements, the time between detection by smoke detectors and the advent of lethal conditions down to head height can be as short as approximately 3 minutes. In addition, it should be expected that approximately 1 minute will be required to evacuate all the occupants of a threatened smoke compartment once the locks are released. In such a case, a prompt release time would be 2 minutes.

A.22.1.4.3 Exception If the Use Condition I facility conforms to the requirements of residential occupancies under this *Code*, there are no staffing requirements. If the Use Condition I facility conforms to the requirements of Use Condition II facilities as permitted by this exception, staffing is required in accordance with Section 22.7.

A.22.2.4.2 An exit is not necessary from each individual fire compartment or smoke compartment if there is access to an exit through other fire compartments or smoke compartments without passing through the fire compartment or smoke compartment of fire origin.

A.22.2.11.3 It might be necessary to provide a certain number of resident sleeping rooms with doors providing a clear width of not less than 32 in. (81 cm) (*see 7.2.1.2*) in order to comply with the requirements for the physically handicapped. Such sleeping rooms should be located where there is a direct accessible route to the exterior or to an area of safe refuge. (*See 22.3.7.*)

FIGURE A.22.1.4.1 Detention and correctional use conditions.



A.22.2.11.6 A remote position is generally a control point where a number of doors can be unlocked simultaneously, either mechanically or electrically. In areas where there are a number of sleeping rooms, it is impractical for attendants to unlock doors individually. Doors in an exit should be unlocked prior to unlocking sleeping room doors. Sight and sound supervision of resident living areas can be by means of camera and communications systems.

This section of the *Code* does not intend to prohibit Use Condition V facilities, nor does it intend to limit Use Condition V facilities to 10 manually released locks.

A.22.3.1.1 Exception No. 2 For purposes of providing control valves and waterflow devices, multilevel residential housing areas complying with this exception are considered to be single story.

A.22.3.2.1 Furnishings are usually the first items ignited in a detention and correctional environment. The type, quantity, and arrangement of furniture and other combustibles are important factors in determining how fast the fire will develop. Furnishings, including upholstered items and wood items such as wardrobes, desks, and bookshelves, might provide sufficient fuel to result in room flashover, which is the full fire involvement of all combustibles within a room once sufficient heat has been built up within the room.

Combustible loading in any room opening onto a residential housing area should be limited to reduce the potential for room flashover. Rooms in which fuel loads are not controlled, thereby creating a potential for flashover, should be considered hazardous areas. Where fire-rated separation is provided, doors to such rooms, including sleeping rooms, should be self-closing.

It is strongly recommended that padded cells not be used due to their fire record. However, recognizing that they will be used in some cases, provisions for the protection of padded cells are provided. It is recognized that the $3/4$ -hour fire door will be violated with the “plant on” of the padding, but a $3/4$ -hour fire door should be the base of the assembly.

A.22.3.4.3.1 Exception The staff at the constantly attended location should have the capability to promptly initiate the general alarm function and contact the fire department or have direct communication with a control room or other location that can initiate the general alarm function and contact the fire department.

A.22.3.4.4 Examples of contiguous common spaces are galleries and corridors.

A.22.3.4.4.3 An open dormitory is a dormitory that is arranged to allow staff to observe the entire dormitory area at one time.

A.22.3.5.4 Exception No. 1 Where access to portable fire extinguishers is locked, staff should be present on a 24-hour basis and should have keys readily available to unlock access to the extinguishers. Where supervision of sleeping areas is from a 24-hour attended staff location, portable fire extinguishers are permitted to be provided at the staff location in lieu of the sleeping area.

A.22.3.7.1 Exception No. 2 A door to the outside, by itself, does not meet the intent of the exception if emergency operating procedures do not provide for the door to be unlocked when needed. In cases where use of the door is not ensured, a true smoke barrier per the base requirement of 22.3.7.1 would be needed.

A.22.3.7.3 Structural fire resistance is defined as the ability of the assembly to stay in place and maintain structural integrity without consideration of heat transmission. Twelve-gauge steel plate suitably framed and stiffened meets this requirement.

A.22.3.7.4 Exception No. 1 As an example, a smoke barrier is permitted to consist of fire-rated glazing panels mounted in a security grille arrangement.

A.22.3.8 The requirements in Table 22.3.8 for smoke-resistant separations include taking the necessary precautions to restrict the spread of smoke through the air-handling system. However, the intent is not that smoke dampers are required to be provided for each opening. Smoke dampers would be one acceptable method; however, other techniques, such as allowing the fans to continue to run with 100 percent supply and 100 percent exhaust, would be acceptable.

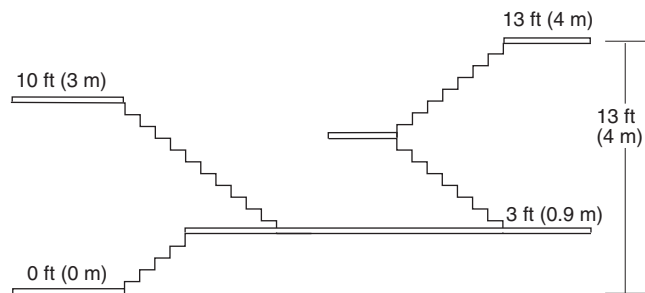
A.22.4.4.3 This provision is intended to promote the use of horizontal exits in detention and correctional occupancies. Horizontal exits provide an especially effective egress system for an occupancy in which the occupants, due to security concerns, are not commonly released to the outside. This provision offers a *Code*-specified equivalent alternative to the Chapter 7 requirement that horizontal exits are not to be penetrated by ducts in nonsprinklered buildings. The intended continuity of the fire resistance-rated and smoke-resisting bar-

rier is maintained by requiring that duct penetrations of horizontal exits be protected by combination fire damper/smoke leakage-rated dampers that will close upon activation of a smoke detector and a heat-actuated mechanism before the barrier’s ability to resist the passage of smoke and fire is compromised.

A.22.4.4.6.2 It is not the intent of this requirement to restrict room face separations, which restrict visibility from the common space into individual sleeping rooms.

A.22.4.4.6.4 The vertical separation between the lowest floor level and the uppermost floor level is not to exceed 13 ft (4 m). Figure A.22.4.4.6.4 illustrates how the height is to be determined.

FIGURE A.22.4.4.6.4 Vertical height measurement.



A.22.4.4.11 The requirements in Table 22.4.4.11 for smoke-resistant and fire-rated separations include taking the necessary precautions to restrict the spread of smoke through the air-handling system. However, the intent is that smoke dampers are required to be provided for each opening. Smoke dampers would be one acceptable method; however, other techniques, such as allowing the fans to continue to run with 100 percent supply and 100 percent exhaust, would be acceptable.

A.22.4.4.12.2(2) The automatic smoke venting should be in accordance with NFPA 204, *Guide for Smoke and Heat Venting*, for light hazard occupancies.

A.22.4.4.13 Personal property provides combustible contents for fire development. Therefore, adequate controls are needed to limit the quantity and combustibility of fuels available to burn to reduce the probability of room flashover. The provisions of 22.4.4.13 will not, by themselves, prevent room flashover if personal property controls are not provided.

A.22.4.4.13.2 Mattresses used in detention and correctional facilities should be evaluated with regard to the fire hazards of the environment. The potential for vandalism and excessive wear and tear also should be taken into account when evaluating the fire performance of the mattress.

A.22.7.1.2 This requirement is permitted to be met by electronic or oral monitoring systems, visual monitoring, call signals, or other means.

A.22.7.1.3 Periodic, coordinated training should be conducted and should involve detention and correctional facility personnel and personnel of the fire department legally committed to serving the facility.

A.22.7.4 Personal property provides combustible contents for fire development. Therefore, adequate controls are needed to limit the quantity and combustibility of the fuels available to burn to reduce the probability of room flashover. The provi-

sions of 22.7.4 will not, by themselves, prevent room flashover if personal property controls are not provided.

CHAPTER 23

A.23.1.1.2 Exception No. 2 In determining equivalency for existing detention and correctional facilities, the authority having jurisdiction is permitted to accept evaluations based on Chapter 4 of NFPA 101A, *Guide on Alternative Approaches to Life Safety*, utilizing the parameters for existing buildings.

A.23.1.2 Detention and correctional facilities are a complex of structures, each serving a definite and usually different purpose. In many institutions all, or almost all, of the occupancy-type classifications found in this *Code* are represented. Means of egress and other features are governed by the type of occupancy classification and the hazard of occupancy, unless specific exceptions are made.

All buildings and structures are to be classified using Chapter 23 and Section 6.1 as a guide, subject to the ruling of the authority having jurisdiction where there is a question as to the proper classification of any individual building or structure.

Use condition classification of the institution, as well as individual areas within the complex, is always to be considered by the authority having jurisdiction.

A.23.1.2.1 Key-operated locking hardware should be of institutional grade. Lesser grade hardware might not be suitable for the heavy use that these locks are expected to receive.

A.23.1.4.1 Users and occupants of detention and correctional facilities at various times can be expected to include staff, visitors, and residents. The extent and nature of facility utilization will vary according to the type of facility, its function, and its programs.

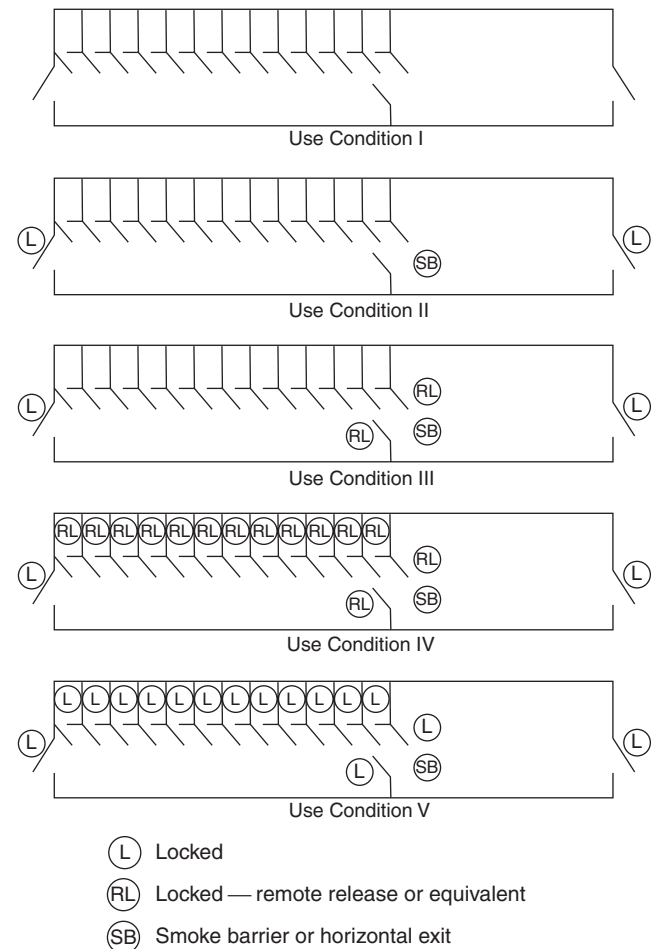
Figure A.23.1.4.1 illustrates the five use conditions.

A.23.1.4.2 Prompt operation is intended to be accomplished in the period of time between detection of fire by either the smoke detector(s) required by 23.3.4 or by other means, whichever comes first, and the advent of intolerable conditions forcing emergency evacuation. Fire tests have indicated that the time available is a function of the volume and height of the space involved and the rate of fire development. In traditional single-story corridor arrangements, the time between detection by smoke detectors and the advent of lethal conditions down to head height can be as short as approximately 3 minutes. In addition, it should be expected that approximately 1 minute will be required to evacuate all the occupants of a threatened smoke compartment once the locks are released. In such a case, a prompt release time would be 2 minutes.

A.23.1.4.3 Exception If the Use Condition I facility conforms to the requirements of residential occupancies under this *Code*, there are no staffing requirements. If the Use Condition I facility conforms to the requirements of Use Condition II facilities as permitted by this exception, staffing is required in accordance with Section 23.7.

A.23.2.2.5.2 An exit is not necessary from each individual fire compartment if there is access to an exit through other fire compartments without passing through the fire compartment of fire origin.

FIGURE A.23.1.4.1 Detention and correctional use conditions.



A.23.2.2.5.3 This provision is intended to promote the use of horizontal exits in detention and correctional occupancies. Horizontal exits provide an especially effective egress system for an occupancy in which the occupants, due to security concerns, are not commonly released to the outside. This provision offers a *Code*-specified equivalent alternative to the Chapter 7 requirement that horizontal exits are not to be penetrated by ducts. The intended continuity of the fire resistance-rated and smoke-resisting barrier is maintained by requiring that duct penetrations of horizontal exits be protected by combination fire damper/smoke leakage-rated dampers that will close upon activation of a smoke detector and a heat-actuated mechanism before the barrier's ability to resist the passage of smoke and fire is compromised.

A.23.2.4.1 Multilevel and multitiered residential housing areas meeting the requirements of 23.3.1.2 and 23.3.1.3 are considered single story. Therefore, two exits are not required from each level; only access to two exits is required.

A.23.2.4.2 An exit is not necessary from each individual fire compartment and smoke compartment if there is access to an exit through other fire compartments or smoke compartments without passing through the fire compartment or smoke compartment of fire origin.

A.23.2.5.2 Every exit or exit access should be arranged, if feasible, so that no corridor or aisle has a pocket or dead end exceeding 50 ft (15 m) for Use Conditions II, III, and IV and 20 ft (6.1 m) for Use Condition V.

A.23.2.11.3 It might be necessary to provide a certain number of resident sleeping rooms with doors providing a clear width of not less than 32 in. (81 cm) (see 7.2.1.2) in order to comply with the requirements for the physically handicapped. Such sleeping rooms should be located where there is a direct accessible route to the exterior or to an area of safe refuge. (See 23.3.7.)

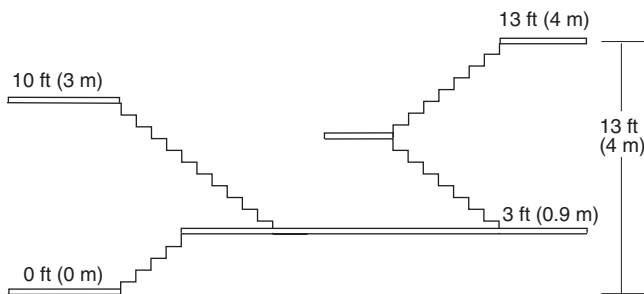
A.23.2.11.6 A remote position is generally a control point where a number of doors can be unlocked simultaneously, either mechanically or electrically. In areas where there are a number of sleeping rooms, it is impractical for attendants to unlock doors individually. Doors in an exit should be unlocked prior to unlocking sleeping room doors. Sight and sound supervision of resident living areas can be by means of camera and communications systems.

This section of the *Code* does not intend to prohibit Use Condition V facilities, nor does it intend to limit Use Condition V facilities to 10 manually released locks.

A.23.3.1.2.1 It is not the intent of this requirement to restrict room face separations, which restrict visibility from the common space into individual sleeping rooms.

A.23.3.1.2.3 The vertical separation between the lowest floor level and the uppermost floor level is not to exceed 13 ft (4 m). Figure A.23.3.1.2.3 illustrates how the height is to be determined.

FIGURE A.23.3.1.2.3 Vertical height measurement.



A.23.3.1.3 A recommended method of calculating the expected level of smoke in a smoke removal-equipped cell block follows.

This method for calculating the expected level of smoke has been developed from data experimentally produced in full-scale burnouts of test cells. The test cells were sized, loaded with fuel, and constructed to represent severe conditions of heavily fuel-loaded (approximately 6 lb/ft² (29 kg/m²)) cells as found in prison locations. The filling rate and temperature of the effluent gas and smoke have been calculated using the data from these tests and established formulae from plume dynamics.

The application of the method described in A.23.3.1.3 should be limited to situations where there is not less than 10 ft (3 m) from the floor level to the lowest acceptable level of smoke accumulation (*Z*); the reservoir above the lowest acceptable level for *Z* is at least 20 percent of the *Z* dimension, the length of the cell block is not less than *Z*, and the

fan is not less than 10 ft (3 m) higher than the floor of the highest cell.

The determination of smoke removal requirements is based on the dimensions of the cell opening. Where more than one cell opening is involved, the larger size on the level being calculated should be used.

The fan size, temperature rating, and operations means can be determined by the following procedure.

(a) *Acceptable Smoke Level.* Determine the lowest acceptable level of smoke accumulation in accordance with 23.3.1.3. The vertical distance between that level and the floor level of the lowest open cell is the value of *Z* to be used in connection with Figure A.23.3.1.3(a).

(b) *Characteristic Cell Opening.* Determine the opening of the cell face. Where there is more than one size of cell opening, use the largest. Match the actual opening to those shown in Figure A.23.3.1.3(b), and use the corresponding curve from Figure A.23.3.1.3(a). If there is no match between the size and shape of the opening and Figure A.23.3.1.3(a), interpolate between the curves. If the opening exceeds 6 ft × 6 ft (1.8 m × 1.8 m), use the curve for a 6-ft × 6-ft (1.8-m × 1.8-m) opening. This curve represents the maximum burning situation, and increasing the size of the opening will not increase the actual burning rate.

(c) *Exhaust Fan Rate.* Determine the exhaust fan capacity needed to extract smoke at a rate that will maintain the smoke level at a point higher than *Z*. This is the rate shown on the baseline of Figure A.23.3.1.3(a) corresponding to the level of *Z* on the vertical axis for the solid line (ventilation rate) curve appropriate to the cell door size. This exhaust capability needs to be provided at a point higher than *Z*.

(d) *Intake Air.* Provide intake air openings that either exist or are automatically provided at times of emergency smoke removal. These openings are to be located at or near the baseline of the cell block to allow for intake air at the rate to be vented by the fan. The openings provided shall be sufficient to avoid a friction load that can reduce the exhaust efficiency. Standard air-handling design criteria are used in making this calculation.

(e) *Fan Temperature Rating.* Determine the potential temperature of gases that the fan might be required to handle by measuring the distance from the floor of the highest cell to the centerline of the fan, or fan ports if the fan is in a duct or similar arrangement. Determine the intersection of the new *Z* value with the appropriate ventilation rate curve (solid line) from Figure A.23.3.1.3(a). Estimate the temperature rise by interpolating along the appropriate ventilation rate curve and between the constant temperature rise curves (dashed lines) from Figure A.23.3.1.3(a). Provide all elements of the exhaust system that are to be above the acceptable smoke level with the capability to effectively operate with the indicated increase in temperature.

(f) *Operation of Exhaust System.* The emergency exhaust system should be arranged to initiate automatically on detection of smoke, on operation of a manual fire alarm system, or by direct manual operation. The capability to manually start the automatic exhaust system should be provided in a guard post in the cell block, at another control location, or both. Where appropriate, the emergency exhaust fans are permitted to be used for comfort ventilation as well as serving their emergency purposes.

FIGURE A.23.3.1.3(a) Cell block smoke control ventilation curves.

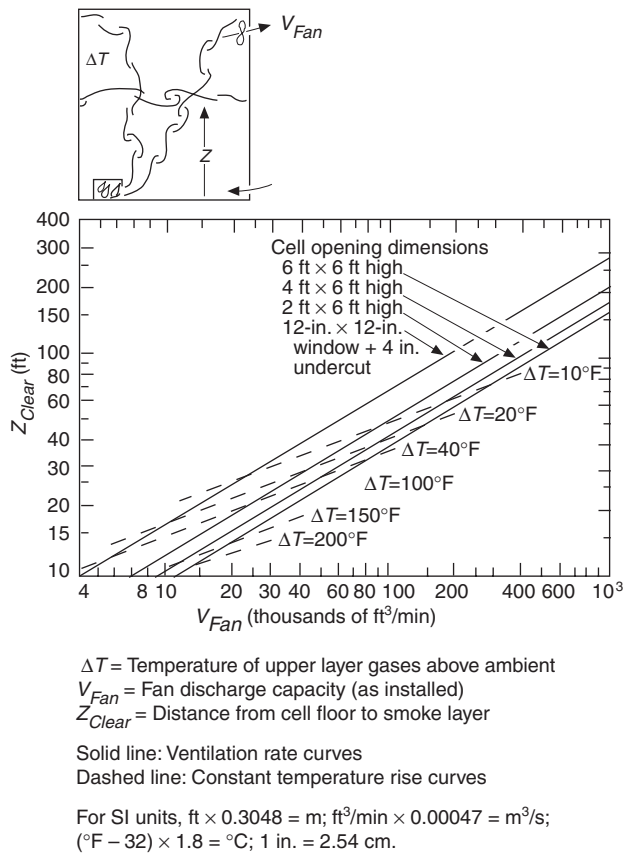
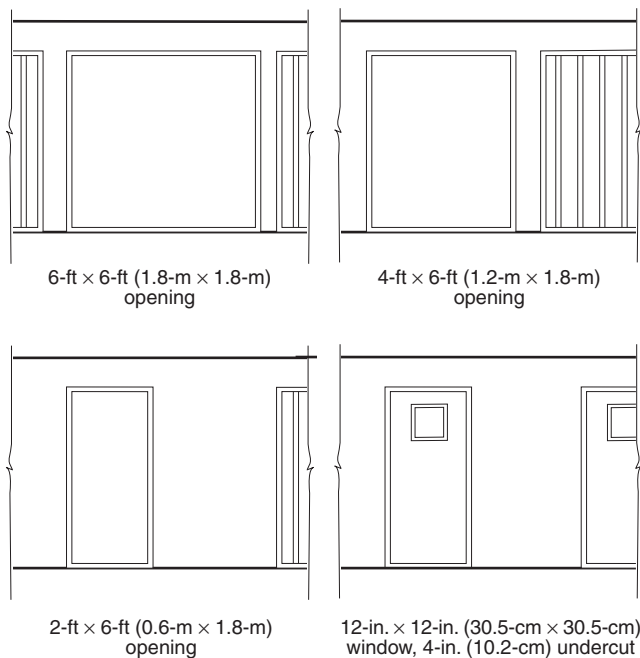


FIGURE A.23.3.1.3(b) Typical cell openings.



A.23.3.2.1 It is strongly recommended that padded cells not be used due to their fire record. However, recognizing that they will be used in some cases, provisions for the protection of padded cells are provided. It is recognized that the $3/4$ -hour fire door will be violated with the “plant on” of the padding, but a $3/4$ -hour fire door should be the base of the assembly.

A.23.3.4.3.1 Exception The staff at the constantly attended location should have the capability to promptly initiate the general alarm function and contact the fire department or have direct communication with a control room or other location that can initiate the general alarm function and contact the fire department.

A.23.3.4.4.3 An open dormitory is a dormitory that is arranged to allow staff to observe the entire dormitory area at one time.

A.23.3.5.2 Where the openings in ceilings or partitions are $1/4$ in. (0.6 cm) or larger in the smallest dimension, where the thickness or depth of the material does not exceed the smallest dimension of the openings, and where such openings constitute not less than 70 percent of the area of the ceiling or partition material, the disruption of sprinkler spray patterns is permitted to be disregarded.

A.23.3.5.4 Exception No. 1 Where access to portable fire extinguishers is locked, staff should be present on a 24-hour basis and should have keys readily available to unlock access to the extinguishers. Where supervision of sleeping areas is from a 24-hour attended staff location, portable fire extinguishers are permitted to be provided at the staff location in lieu of the sleeping area.

A.23.3.7.1 Consideration can be given for large open areas that might be permitted to function as smoke sinks as an alternative to the installation of more than one smoke barrier as required by 23.3.7. Vertical movement downward to an area of refuge might be permitted by the authority having jurisdiction in lieu of horizontal movement.

A.23.3.7.1 Exception No. 2 A door to the outside, by itself, does not meet the intent of the exception if emergency operating procedures do not provide for the door to be unlocked when needed. In cases where use of the door is not ensured, a true smoke barrier per the base requirement of 23.3.7.1 would be needed.

A.23.3.7.2(2) Consideration should be given to increasing the travel distance to a smoke barrier to coincide with existing range lengths and exits.

A.23.3.7.3 Structural fire resistance is defined as the ability of the assembly to stay in place and maintain structural integrity without consideration of heat transmission. Twelve-gauge steel plate suitably framed and stiffened meets this requirement.

A.23.3.7.4 Exception No. 1 As an example, a smoke barrier is permitted to consist of fire-rated glazing panels mounted in a security grille arrangement.

A.23.3.8 The requirements in Table 23.3.8 for smoke-resistant and fire-rated separations include taking the necessary precautions to restrict the spread of smoke through the air-handling system. However, the intent is not that smoke dampers are required to be provided for each opening. Smoke dampers would be one acceptable method; however, other techniques, such as allowing the fans to continue to run with 100 percent supply and 100 percent exhaust, would be acceptable.

A.23.4.1.2(2) The automatic smoke venting should be in accordance with NFPA 204, *Guide for Smoke and Heat Venting*, for light hazard occupancies.

A.23.7.1.2 This requirement is permitted to be met by electronic or oral monitoring systems, visual monitoring, call signals, or other means.

A.23.7.1.3 Periodic, coordinated training should be conducted and should involve detention and correctional facility personnel and personnel of the fire department legally committed to serving the facility.

A.23.7.4 Personal property provides combustible contents for fire development. Therefore, adequate controls are needed to limit the quantity and combustibility of the fuels available to burn to reduce the probability of room flashover. The provisions of 23.7.4 will not, by themselves, prevent room flashover if personal property controls are not provided.

A.23.7.4.3 Mattresses used in detention and correctional facilities should be evaluated with regard to the fire hazards of the environment. The potential for vandalism and excessive wear and tear also should be taken into account when evaluating the fire performance of the mattress.

CHAPTER 24

A.24.1.1.1 The *Code* specifies that wherever there are three or more living units in a building, the building is considered an apartment building and is required to comply with either Chapter 30 or Chapter 31, as appropriate. A townhouse unit is considered to be an apartment building if there are three or more units in the building. The type of wall required between units in order to consider them as separate buildings is normally established by the authority having jurisdiction. If the units be separated by a wall of sufficient fire resistance and structural integrity to be considered as separate buildings, then the provisions of Chapter 24 apply to each townhouse. Condominium is a form of ownership, not occupancy; for example, there are condominium warehouses, condominium apartments, and condominium offices.

The provisions of 24.1.1.1 state that, in one- and two-family dwellings, each dwelling unit can be “occupied by members of a single family with not more than three outsiders...” The Code does not define the term *family*. The definition of *family* is subject to federal, state, and local regulations and might not be restricted to a person or a couple (two people) and their children. The following examples aid in differentiating between a single-family dwelling and a lodging or rooming house:

- (1) An individual or a couple (two people) who rent a house from a landlord and then sublease space for up to three individuals should be considered a family renting to a maximum of three outsiders, and the house should be regulated as a single-family dwelling in accordance with Chapter 24.
- (2) A house rented from a landlord by an individual or a couple (two people) in which space is subleased to four or more individuals, but not more than 16, should be considered and regulated as a lodging or rooming house in accordance with Chapter 26.
- (3) A residential building that is occupied by four or more individuals, but not more than 16, each renting from a landlord, without separate cooking facilities, should be considered and regulated as a lodging or rooming house in accordance with Chapter 26.

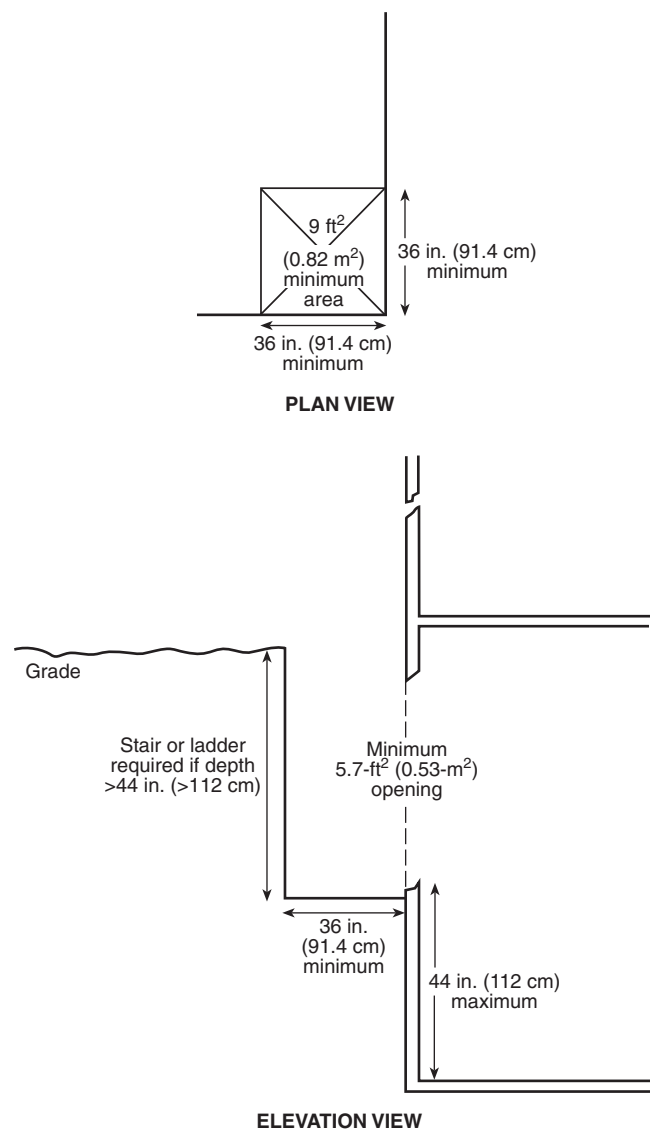
A.24.2 The phrase “means of escape” indicates a way out of a residential unit that does not conform to the strict definition of means of egress but does meet the intent of the definition by providing an alternative way out of a building. (See A.7.1.1 and means of escape in 3.3.122.)

A.24.2.2.3 For use of emergency escape devices, refer to A.7.1.1.

A.24.2.2.3(c) A window with dimensions of 20 in. × 24 in. (51 cm × 61 cm) has an opening of 3.3 ft² (0.31 m²), which is less than the required 5.7 ft² (0.53 m²). Therefore, either the height or width needs to exceed the minimum requirement to provide the required clear area. (See Figure A.24.2.2.3(c)).

A.24.2.4.6 It is the intent of this requirement that security measures, where installed, do not prevent egress.

FIGURE A.24.2.2.3(c) Escape window utilizing a window well.



CHAPTER 26

A.26.1.1.1 Bed and breakfast occupancies with more than 3, but fewer than 16, occupants are considered lodging and rooming houses.

A.26.2.7 It is the intent of this requirement that security measures, where installed, do not prevent egress.

A.26.3.3.3 Exception No. 1 The proprietor is the owner or owner's agent with responsible charge.

A.26.3.5.1 The decision to permit the use of the criteria from NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*, in these occupancies is based on the following:

- (1) The desire to obtain a level of fire suppression and control that is approximately equivalent to that delivered by residential facilities protected by such systems (*see the appendix statement in NFPA 13D, Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*)
- (2) The fact that potential fire exposure and challenge to the suppression system in a small lodging and rooming occupancy is of the same nature and no more severe than that found in residences

CHAPTER 28

A.28.2.2.12 The provision of 28.2.2.12 permits the entire floor to serve as an area of refuge where it is protected in accordance with 28.3.5. The provision is acceptable because supervised automatic sprinkler systems have built-in signals for monitoring features of the system, such as the opening and closing of water control valves. Such systems also monitor pump power supplies, water tank levels, and conditions that will impair the satisfactory operation of the sprinkler system. Because of these monitoring features, supervised automatic sprinkler systems have a high level of satisfactory performance and response to fire conditions.

A.28.2.3.3 Exception This exception applies to corridors within an individual room or suite and does not apply where a suite can be subdivided and rented separately.

A.28.2.7.2 Where open stairways are permitted, they are considered as exit access to exits rather than as exits, and the requirements for travel distance to exits include the travel on such stairs. (*See 7.6.2.*)

A.28.3.3.4 In nonsprinklered hotels, dormitories, or apartment buildings, new upholstered furniture located in corridors or areas not separated from corridors by corridor walls, as specified in the *Code*, should be tested in accordance with NFPA 261, *Standard Method of Test for Determining Resistance of Mock-Up Upholstered Furniture Material Assemblies to Ignition by Smoldering Cigarettes*. The char length is not to exceed 1¹/₂ in. (3.8 cm) and should be labeled to indicate such compliance.

A.28.3.4.3.1 Visible signaling appliances might be governed by provisions of federal regulations in 28 *CFR* 36, Appendix A (Americans with Disabilities Act Accessibility Guidelines — ADAAG), Section 4.28, Alarms.

A.28.3.4.3.2 A quantity of such rooms and suites might be required to be equipped to accommodate hearing impaired individuals based on the total number of rooms in a transient lodging facility. (*See 28 CFR 36, Appendix A (Americans with Dis-*

abilities Act Accessibility Guidelines — ADAAG), Sections 9.1.3, 9.1.5, and 9.2.2(8).)

A.28.3.4.3.5 The provision for immediate notification of the public fire department is intended to include, but is not limited to, all of the arrangements in 9.6.4. Other arrangements that depend on a clerk or other member of the staff to notify the fire department might also be permitted. In such cases, however, it is essential that a trained staff member and an immediately available means of calling the fire department are continuously available. If a telephone is to be used, it should not be of any type or arrangement that requires a coin or the unlocking of a device to contact the fire department.

A.28.3.4.5 Caution needs to be exercised in locating smoke detectors with regard to their proximity to bathrooms, cooking facilities, and HVAC outlets in order to prevent nuisance alarms.

A.28.5.3 “Protected power supply” means a source of electrical energy of sufficient capacity to allow proper operation of the elevator and its associated control and communications systems. The power supply's point of origin, system of distribution, type and size of overcurrent protection, degree of isolation from other portions of the building electrical system, and degree of mechanical protection should be such that it is unlikely that the supply would be disrupted at any but the advanced stages of building fire involvement or by structural collapse.

A protected power supply might consist of, and should provide, not less than the level of reliability associated with an electrical distribution system with service equipment located and installed in accordance with Section 230-72(b) and Section 230-82(5) of NFPA 70, *National Electrical Code*. The distribution system is not to have any other connection to the building electrical distribution system. A protected power supply is not required to incorporate two sources of energy or automatic transfer capability from a normal to an emergency source, for example, an alternate set of service conductors.

The number and type of elevators to be connected to a protected power supply should be limited, or the characteristics of the protected power supply should be selected to ensure conformance with Section 230-95 of NFPA 70, *National Electrical Code*, without the provision of ground fault protection for the supply.

An elevator installation supplied by a protected power supply should comply with Article 620 of NFPA 70, *National Electrical Code*, except that the energy absorption means required by Section 620-91 should always be connected on the load side of the disconnecting means. The energy absorption means should not consist of loads likely to become inoperative or disconnected under the conditions assumed to exist when the elevator is under the control of fire department personnel. Examples of such loads include light and power loads external to the elevator equipment room.

A.28.7.1.1 Employers are obligated to determine the degree to which employees are to participate in emergency activities. Regulations of the U.S. Department of Labor (OSHA) govern these activities and provide options for employers, from total evacuation to aggressive structural fire fighting by employee brigades. (*For additional information, see OSHA Regulations for Emergency Procedures and Fire Brigades, 29 CFR 1910, E and L.*)

A.28.7.1.2 Emergencies should be assumed to have arisen at various locations in the occupancy in order to train employees in logical procedures.

A.28.7.4.1 Floor diagrams should reflect the actual floor arrangement and should be oriented with the actual direction to the exits.

A.28.7.4.2 Factors for developing the fire safety information include such items as construction type, suppression systems, alarm and detection systems, building layout, and building HVAC systems.

CHAPTER 29

A.29.2.2.8 Due to the nature of escalators, they are no longer acceptable as a component in a means of egress. However, since many escalators have been used for exit access and exit discharge in the past, they are permitted to continue to be considered in compliance. Very few escalators have ever been installed in a manner to qualify as an exit. For information on escalator protection and requirements, see previous editions of the *Code*.

A.29.2.2.12 The provision of 29.2.2.12 permits the entire floor to serve as an area of refuge where it is protected in accordance with 29.3.5. The provision is acceptable because supervised automatic sprinkler systems have built-in signals for monitoring features of the system, such as the opening and closing of water control valves. Such systems also monitor pump power supplies, water tank levels, and conditions that will impair the satisfactory operation of the sprinkler system. Because of these monitoring features, supervised automatic sprinkler systems have a high level of satisfactory performance and response to fire conditions.

A.29.2.7.2 Where open stairways or escalators are permitted, they are considered as exit access to exits rather than as exits, and the requirements for travel distance to exits include the travel on such stairs and escalators. (See 7.6.2.)

A.29.3.3.4 In nonsprinklered hotels, dormitories, or apartment buildings, new upholstered furniture located in corridors or areas not separated from corridors by corridor walls, as specified in the *Code*, should be tested in accordance with NFPA 261, *Standard Method of Test for Determining Resistance of Mock-Up Upholstered Furniture Material Assemblies to Ignition by Smoldering Cigarettes*. The char length is not to exceed 1¹/₂ in. (3.8 cm), and should be labeled to indicate such compliance.

A.29.3.4.3.2 The provision for immediate notification of the public fire department is intended to include, but is not limited to, all of the arrangements in 9.6.4. Other arrangements that depend on a clerk or other member of the staff to notify the fire department might also be permitted. In such cases, however, it is essential that a trained staff member and an immediately available means of calling the fire department are continuously available. If a telephone is to be used, it should not be of any type or arrangement that requires a coin or the unlocking of a device to contact the fire department.

A.29.3.4.5 Caution needs to be exercised in locating smoke detectors with regard to their proximity to bathrooms, cooking facilities, and HVAC outlets in order to prevent nuisance alarms.

A.29.3.5.1 Although not required by the *Code*, the use of residential sprinklers or quick-response sprinklers is encouraged for new installations of sprinkler systems within dwelling units,

apartments, and guest rooms. Caution should be exercised, as the system needs to be designed for the sprinkler being used.

A.29.7.1.1 Employers are obligated to determine the degree to which employees are to participate in emergency activities. Regulations of the U.S. Department of Labor (OSHA) govern these activities and provide options for employers, from total evacuation to aggressive structural fire fighting by employee brigades. (For additional information, see *OSHA Regulations for Emergency Procedures and Fire Brigades*, 29 CFR 1910, E and L.)

A.29.7.1.2 Emergencies should be assumed to have arisen at various locations in the occupancy in order to train employees in logical procedures.

A.29.7.4.1 Floor diagrams should reflect the actual floor arrangement and should be oriented with the actual direction to the exits.

A.29.7.4.2 Factors for developing the fire safety information include such items as construction type, suppression systems, alarm and detection systems, building layout, and building HVAC systems.

CHAPTER 30

A.30.2.2.2.2 It is the intent of this requirement that security measures, where installed, should not prevent egress.

A.30.2.2.12 The provision of 30.2.2.12 permits the entire floor to serve as an area of refuge where it is protected in accordance with 30.3.5. The provision is acceptable because supervised automatic sprinkler systems have built-in signals for monitoring features of the system, such as the opening and closing of water control valves. Such systems also monitor pump power supplies, water tank levels, and conditions that will impair the satisfactory operation of the sprinkler system. Because of these monitoring features, supervised automatic sprinkler systems have a high level of satisfactory performance and response to fire conditions.

A.30.3.4.5.1 Previous editions of the *Code* permitted the single-station smoke detector required by 30.3.4.5.1 to be omitted from each apartment where a complete automatic smoke detection system was installed throughout the building. With such a system, when one detector is activated, an alarm is sounded throughout the building. Experience with complete smoke detection systems in apartment buildings has shown that numerous nuisance alarms are likely to occur. Where there is a problem with frequent nuisance alarms, occupants ignore the alarm, or the system is either disconnected or otherwise rendered inoperative.

CHAPTER 31

A.31.1 See Table A.31.1.

A.31.2.2.8 Due to the nature of escalators, they are no longer acceptable as a component in a means of egress. However, since many escalators have been used for exit access and exit discharge in the past, they are permitted to continue to be considered in compliance. Very few escalators have ever been installed in a manner to qualify as an exit. For information on escalator protection and requirements, see previous editions of the *Code*.

Table A.31.1 Alternate Requirements for Existing Apartment Buildings According to Protection Provided

	No Suppression or Detection System Option No. 1	Total Automatic Fire Detection Option No. 2	Sprinkler Protection in Selected Areas Option No. 3	Auto Extinguishing per NFPA 13 (with exceptions) Option No. 4
Exit Access				
Travel distance from apartment door to exit	100 ft (30 m)	150 ft (45 m)	150 ft (45 m)	200 ft (60 m)
Travel distance within apartment	75 ft (23 m)	125 ft (38 m)	75 ft (23 m)	125 ft (38 m)
Smoke barrier req. (See 31.3.7.)	R	R	R	NR
Max. single path corridor distance	35 ft (10.7 m)	35 ft (10.7 m)	35 ft (10.7 m)	35 ft (10.7 m)
Max. dead end	50 ft (15 m)	50 ft (15 m)	50 ft (15 m)	50 ft (15 m)
Corridor fire resistance				
Walls	1/2 hr	1/2 hr	1/2 hr	1/2 hr
Doors (fire protection rating)	20 min. or 1 ³ / ₄ -in. (4.4-cm) thick	20 min. or 1 ³ / ₄ -in. (4.4-cm) thick	smoke-resisting	smoke-resisting
Interior Finish				
Lobbies and corridors	A or B	A or B	A or B	A, B, or C
Other spaces	A, B, or C	A, B, or C	A, B, or C	A, B, or C
Floors in corridors	I or II	I or II	NR	NR
Exits				
Wall fire resistance				
1-3 stories	1 hr	1 hr	1 hr	1 hr
>3 stories	2 hr	2 hr	2 hr	1 hr
Smokeproof enclosures				
Not high-rise	NR	NR	NR	NR
High-rise	R	R	R	NR
Door fire resistance				
1-3 stories	1 hr	1 hr	1 hr	1 hr
>3 stories	1 ¹ / ₂ hr	1 ¹ / ₂ hr	1 ¹ / ₂ hr	1 hr
Interior finish				
Walls and ceilings	A or B	A or B	A or B	A, B, or C
Floors	I or II	I or II	I or II	NR
Within Living Unit (Apartment)				
Escape windows, per Section 24.2 (See 31.2.1.)	R	R	R	NR
Alarm System				
>3 stories or >11 units	Manual initiation	Manual & auto initiation	Manual & auto initiation	Manual & auto initiation
>2 stories or >50 units	Annunciator panel	Annunciator panel	Annunciator panel	Annunciator panel

R: Required (see Code for details and exceptions).

NR: No requirements.

A.31.2.2.12 The provision of 31.2.2.12 permits the entire floor to serve as an area of refuge where it is protected in accordance with 31.3.5. The provision is acceptable because supervised automatic sprinkler systems have built-in signals for monitoring features of the system, such as the opening and closing of water control valves. Such systems also monitor pump power supplies, water tank levels, and conditions that will impair the satisfactory operation of the sprinkler system. Because of these monitoring features, supervised automatic sprinkler systems have a high level of satisfactory performance and response to fire conditions.

A.31.2.11 The provision of 31.2.11 recognizes the need to provide smoke control in existing buildings. Smokeproof enclosures can be accomplished without the use of a vestibule in accordance with 7.2.3.

A.31.3.5.1 Although not required by the Code, the use of residential sprinklers or quick-response sprinklers is encouraged for new installations of sprinkler systems within dwelling units, apartments, and guest rooms. Caution should be exercised, as the system needs to be designed for the sprinkler being used.

A.31.3.5.6 Exception No. 2 This system might consist of a combination of any or all of the following systems:

- (1) Partial automatic sprinkler protection
- (2) Smoke detection alarms
- (3) Smoke control
- (4) Compartmentation or other approved systems, or both

A.31.3.6.1 The intent is to recognize that existing partitions of sound wood lath and plaster, wire lath and plaster, or gypsum lath and plaster construction have demonstrated the abil-

ity to contain most room fires. Recent data on archaic construction methods have established the fire resistance rating of such construction at about 20 minutes. Such construction meets the intent of 31.3.6.1.

CHAPTER 32

A.32.1.1 The requirements of Chapter 32 are designed to accommodate typical changes in the capabilities of the resident, such as those due to accidents, temporary illness, cyclical variations in capabilities, and gradual aging. This approach is based on the assumption that the capabilities of the resident will be evaluated not less than annually, and for residents with geriatric problems or degenerative diseases, not less than every 6 months. Also, residents should be re-evaluated after each accident or illness that requires hospitalization.

The requirements of Chapter 32 were developed on the assumption that the occupants will normally evacuate the building in fire emergencies. During fire exit drills, all occupants should evacuate the building with staff assistance as needed. Exceptions can be made in facilities with an evacuation capability rating of impractical (*see 32.7.3*). Managers of board and care homes with nursing home backgrounds sometimes are not aware of the differences between the requirements of 18.7.1 and 32.7.3.

A.32.1.5 The provisions of 8.2.3.1.2(3) address a $1/2$ -hour fire resistance rating. The information in A.8.2.3.1.2(3) addresses common materials used in $1/2$ -hour fire resistance-rated barriers.

A.32.2.1.2.1 Exception In determining equivalency for conversions, modernizations, renovations, or unusual design concepts, the authority having jurisdiction might permit evaluations based on NFPA 101A, *Guide on Alternative Approaches to Life Safety*, Chapter 6.

A.32.2.2.3(c) A window with dimensions of 20 in. \times 24 in. (51 cm \times 61 cm) has an opening of 3.3 ft² (0.31 m²), which is less than the required 5.7 ft² (0.53 m²). Therefore, either the height or width needs to exceed the minimum requirement to provide the required clear area.

A.32.2.3.5.2 The decision to permit the use of the criteria from NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*, in these occupancies is based on the following:

- (1) The desire to obtain a level of fire suppression and control approximately equivalent to that delivered by residential facilities protected by such systems (*see the appendix statement in NFPA 13D, Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*)
- (2) The fact that potential fire exposure and challenge to the suppression system in a small board and care facility are of the same nature and are no more severe than those found in residences

Chapter 32 permits the use of NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*, and NFPA 13R, *Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height*, outside of their scopes. This permission based on a review of the occupancy and a recognition that the fires in board and care facilities is similar to those of other residential occupancies and that the level of protection is appropriate. In some circumstances, such as those for impractical evacuation capabilities, the requirements of NFPA 13D and NFPA 13R have been supplemented with require-

ments for additional water supplies to compensate for the special needs of the board and care occupancy.

A.32.2.3.5.2 Exception No. 1 NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*, contains additional requirements for a piping system serving both sprinkler and domestic needs.

A.32.3.1.2.1 Exception In determining equivalency for conversions, modernizations, renovations, or unusual design concepts, the authority having jurisdiction might permit evaluations based on NFPA 101A, *Guide on Alternative Approaches to Life Safety*, Chapter 6.

A.32.3.1.2.2 Exception In determining equivalency for conversions, modernizations, renovations, or unusual design concepts, the authority having jurisdiction might permit evaluations based on NFPA 101A, *Guide on Alternative Approaches to Life Safety*, Chapter 3, using the mandatory safety requirements for nursing homes.

A.32.3.3.4.6 See A.28.3.4.3.5.

A.32.3.3.5.1 It is intended that this requirement apply to existing small facilities that are converted to large facilities.

Chapter 32 permits the use of NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*, and NFPA 13R, *Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height*, outside of their scopes. This permission is based on a review of the occupancy and a recognition that the fires in board and care facilities are similar to those of other residential occupancies and that the level of protection is appropriate. In some circumstances, such as those for impractical evacuation capabilities, the requirements of NFPA 13D and NFPA 13R have been supplemented with requirements for additional water supplies to compensate for the special needs of the board and care occupancy.

A.32.3.6.3.2 See A.28.5.3.

A.32.4 Board and care occupancies in apartment buildings will usually be small facilities housing 16 or fewer residents. It is intended that the board and care occupancy conform to the requirements of Section 32.2 for small board and care facilities. In the unusual case where an apartment houses a large board and care facility, it would be reasonable for the authority having jurisdiction, using 4.6.1, to apply the provisions of Section 32.3 to the apartment. In addition, the apartment building in which the facility is housed needs to comply with the requirements for apartment buildings in Chapters 30 and 31 and the additional criteria presented in Section 32.4.

A.32.4.1.3.1 Exception In determining equivalency for conversions, modernizations, renovations, or unusual design concepts, the authority having jurisdiction might permit evaluations based on NFPA 101A, *Guide on Alternative Approaches to Life Safety*, Chapter 6.

A.32.7.4.1 Smoking regulations should include the following.

(a) Smoking should be prohibited in any room, compartment or area where flammable or combustible liquids, combustible gases, or oxygen is used or stored and in any other hazardous location. Such areas should be posted with signs that read NO SMOKING or the international symbol for no smoking. In residential board and care facilities where smoking is totally prohibited and signs so indicating are placed at all major entrances, secondary signs with language that prohibits smoking are not required.

(b) Smoking by residents classified as not responsible with regard to their ability to safely use and dispose of smoking materials should be prohibited. Where the resident is under direct supervision by staff or by a person approved by the administration, smoking might be permitted.

(c) Smoking materials should not be provided to residents or maintained by residents without the approval of the administration.

(d) Areas where smoking is permitted should be clearly identified.

(e) Ashtrays of noncombustible material and safe design should be provided and required to be used in all areas where smoking is permitted.

(f) Self-closing cover devices into which ashtrays can be emptied should be made available to all areas where smoking is permitted and should be required to be used.

A.32.7.5 The requirements applicable to draperies/curtains, upholstered furniture, and mattresses apply only to new draperies/curtains, new upholstered furniture, and new mattresses. The word *new* means unused, normally via procurement from the marketplace, either by purchase or donation, of items not previously used. Many board and care facilities allow residents to bring into the board and care home upholstered furniture items from the resident's previous residence. Such an item is not new and, thus, is not regulated. On the other hand, some of the larger board and care homes purchase contract furniture, as is done in hotels. Such new, unused furniture, whether purchased or received as a donation, is regulated by the requirements of 32.7.5.2. By federal law, mattresses manufactured and sold within the United States must pass testing per FF4-72, *Standard for the Flammability of Mattresses*.

A.32.7.5.2 New upholstered furniture within board and care homes should be tested for rates of heat release in accordance with 10.3.3.

A.32.7.5.3 New mattresses within board and care homes should be tested for rates of heat release in accordance with 10.3.4.

CHAPTER 33

A.33.1.1 The requirements of Chapter 33 are designed to accommodate typical changes in the capabilities of the resident, such as those due to accidents, temporary illness, cyclical variations in capabilities, and gradual aging. This approach is based on the assumption that the capabilities of the resident will be evaluated not less than annually, and for residents with geriatric problems or degenerative diseases, not less than every 6 months. Also, residents should be re-evaluated after each accident or illness that requires hospitalization.

The requirements of Chapter 33 were developed on the assumption that the occupants will normally evacuate the building in fire emergencies. During fire exit drills, all occupants should evacuate the building with staff assistance as needed. Exceptions can be made in facilities with an evacuation capability rating of impractical (*see* 33.7.3). Managers of board and care homes with nursing home backgrounds sometimes are not aware of the differences between the requirements of 19.7.1 and 33.7.3.

A.33.1.5 The provisions of 8.2.3.1.2(3) address a $1/2$ -hour fire resistance rating. The information in A.8.2.3.1.2(3) addresses common materials used in $1/2$ -hour fire resistance-rated barriers.

A.33.1.7 When the group evacuation capability changes to a level of greater risk, the owner/operator of the facility needs to take such action as is necessary, within a reasonable time frame, to restore the evacuation capability of the facility to that for which it was approved. If subsequent evaluations indicate that the original evacuation capability of the facility cannot or is not being maintained at the original level of risk, the facility would be considered as having changed the occupancy sub-classification to one of greater risk, and the safeguards required for the level of greater risk would apply. If a facility improves its original evacuation capability to one of less risk, a re-evaluation and upgrading to the requirements for new construction is not needed.

A.33.2.1.2.1 Exception No. 1 In determining equivalency for existing buildings, conversions, modernizations, renovations, or unusual design concepts, the authority having jurisdiction might permit evaluations based on NFPA 101A, *Guide on Alternative Approaches to Life Safety*, Chapter 6.

A.33.2.2.3(c) A window with dimensions of 20 in. \times 24 in. (51 cm \times 61 cm) has an opening of 3.3 ft² (0.31 m²), which is less than the required 5.7 ft² (0.53 m²). Therefore, either the height or width needs to exceed the minimum requirement to provide the required clear area.

A.33.2.3.4.3 Most often smoke alarms sounding an alarm at 85 dBA or greater, installed outside the bedroom area, will meet the intent of this requirement. Smoke alarms remotely located from the bedroom might not be loud enough to awaken the average person. In such cases, it is recommended that smoke alarms be interconnected so that the activation of any smoke alarm will cause all smoke alarms to activate.

A.33.2.3.5.2 The decision to permit the use of the criteria from NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*, in these occupancies is based on the following:

- (1) The desire to obtain a level of fire suppression and control approximately equivalent to that delivered by residential facilities protected by such systems (*see the appendix statement in NFPA 13D, Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*)
- (2) The fact that potential fire exposure and challenge to the suppression system in a small board and care facility are of the same nature and are no more severe than those found in residences.

Chapter 33 permits the use of NFPA 13D and NFPA 13R, *Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height*, outside of their scopes. This permission is based on a review of the occupancy and a recognition that the fires in board and care facilities are similar to those of other residential occupancies and that the level of protection is appropriate. In some circumstances, such as those for impractical evacuation capabilities, the requirements of NFPA 13D and NFPA 13R have been supplemented with requirements for additional water supplies to compensate for the special needs of the board and care occupancy.

A.33.3.1.2.1 Exception No. 1 In determining equivalency for existing buildings, conversions, modernizations, renovations, or unusual design concepts, the authority having jurisdiction might permit evaluations based on NFPA 101A, *Guide on Alternative Approaches to Life Safety*, Chapter 6.

A.33.3.1.2.2 Exception In determining equivalency for existing buildings, the authority having jurisdiction might permit evaluations based on NFPA 101A, *Guide on Alternative Approaches to Life Safety*, Chapter 3, substituting Table A.33.3.1.2.2 *mandatory safety requirements* values for those contained in NFPA 101A.

Table A.33.3.1.2.2 Substitute Mandatory Safety Requirements Values

Zone Location	Containment S _a	Extinguishment S _b	People
			Movement S _c
First floor	5	6	3
Above or below first floor	9	8	5
Over 75 ft (23 m) in height	9	8	5

A.33.3.3.4.6 See A.29.3.4.3.2.

A.33.3.3.5.1 It is intended that this requirement apply to existing small facilities that are converted to large facilities.

Chapter 33 permits the use of NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*, and NFPA 13R, *Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height*, outside of their scopes. This permission is based on a review of the occupancy and a recognition that the fires in board and care facilities are similar to those of other residential occupancies and that the level of protection is appropriate. In some circumstances, such as those for impractical evacuation capabilities, the requirements of NFPA 13D and NFPA 13R have been supplemented with requirements for additional water supplies to compensate for the special needs of the board and care occupancy.

A.33.4 Board and care occupancies in apartment buildings will usually be small facilities housing 16 or fewer residents. It is intended that the board and care occupancy conform to the requirements of Section 33.2 for small board and care facilities. In the unusual case where an apartment houses a large board and care facility, it would be reasonable for the authority having jurisdiction, using 6.1.14, to apply the provisions of Section 33.3 to the apartment. In addition, the apartment building in which the facility is housed needs to comply with the requirements for apartment buildings in Chapters 30 and 31 and the additional criteria presented in Section 33.4.

A.33.4.1.3.1 Exception In determining equivalency for existing buildings, conversions, modernizations, renovations, or unusual design concepts, the authority having jurisdiction might permit evaluations based on NFPA 101A, *Guide on Alternative Approaches to Life Safety*, Chapter 6.

A.33.7.4.1 Smoking regulations should include the following:

(a) Smoking should be prohibited in any room, compartment or area where flammable or combustible liquids, combustible gases, or oxygen is used or stored and in any other hazardous location. Such areas should be posted with signs that read NO SMOKING or the international symbol for no smoking. In residential board and care facilities where smoking is totally prohibited and signs so indicating are placed at

all major entrances, secondary signs with language that prohibits smoking are not required.

(b) Smoking by residents classified as not responsible with regard to their ability to safely use and dispose of smoking materials should be prohibited. Where the resident is under direct supervision by staff or by a person approved by the administration, smoking might be permitted.

(c) Smoking materials should not be provided to residents or maintained by residents without the approval of the administration.

(d) Areas where smoking is permitted should be clearly identified.

(e) Ashtrays of noncombustible material and safe design should be provided and required to be used in all areas where smoking is permitted.

(f) Self-closing cover devices into which ashtrays can be emptied should be made available to all areas where smoking is permitted and should be required to be used.

A.33.7.5 The requirements applicable to draperies/curtains, upholstered furniture, and mattresses apply only to new draperies/curtains, new upholstered furniture, and new mattresses. The word *new* means unused, normally via procurement from the marketplace, either by purchase or donation, of items not previously used. Many board and care facilities allow residents to bring into the board and care home upholstered furniture items from the resident's previous residence. Such an item is not new and, thus, is not regulated. On the other hand, some of the larger board and care homes purchase contract furniture, as is done in hotels. Such new, unused furniture, whether purchased or received as a donation, is regulated by the requirements of 33.7.5.2. By federal law, mattresses manufactured and sold within the United States must pass testing per FF4-72, *Standard for the Flammability of Mattresses*.

A.33.7.5.2 New upholstered furniture within board and care homes should be tested for rates of heat release in accordance with 10.3.3.

A.33.7.5.3 New mattresses within board and care homes should be tested for rates of heat release in accordance with 10.3.4.

CHAPTER 36

A.36.2.2.2.2 The words "principal entrance/exit doors" describe doors that the authority having jurisdiction can reasonably expect to be unlocked in order for the facility to do business.

A.36.2.2.7 Exception To design egress from a covered mall building, the following steps should be used.

(a) The covered mall/pedestrian way has been assigned no occupant load, but it is required to be provided with means of egress sized to accommodate the total occupant load of the covered mall building based on the gross leasable area. The exits for the covered mall/pedestrian way are permitted to be provided by a combination of exterior exit doors and exit passageways.

(b) After completion of step (a), each tenant space is to be judged individually for occupant load and egress capacity. This step normally sends a portion or all (per 36.4.4.2.2) of the tenant space's occupant load into the covered mall. Any remaining occupants are sent through the back of the tenant space into an exit passageway that might serve multiple tenant spaces and the covered mall.

(c) The width of the exit passageway is required to be sized for the most restrictive of the following:

- (1) For a width of not less than 66 in. (168 cm) per 36.4.4.1 Exception (b)
- (2) For the portion of the egress capacity from the largest single tenant space being served by the exit passageway
- (3) For the portion of the egress capacity from the covered mall being provided by the exit passageway

The concepts used in steps (a) through (c) include the following:

- (1) After proper egress capacity is provided for the covered mall/pedestrian way, each tenant space is then required to independently provide egress capacity for its occupants.
- (2) The covered mall required exit passageway width and the tenant space required exit passageway width are not required to be added together.
- (3) The required exit passageway width for a tenant space is not required to be added to that of other tenant spaces using the same exit passageway.

A.36.2.5.9 In order to eliminate the obstruction to the means of egress of the interior exit access and the exterior exit discharge, it is the intent to provide adequate area for transit and parking of wheeled carts or buggies used by customers. This area includes corral areas adjacent to exits that are constructed to restrict the movement of wheeled carts or buggies therefrom.

A.36.2.7.2 The basis for the exception to the general rule on complete enclosure of exits up to their point of discharge to the outside of the building is that, with the specified safeguards, reasonable safety is maintained.

A stairway is not considered to discharge through the street floor area if it leads to the street through a fire resistance-rated enclosure (exit passageway) separating it from the main area, even though there are doors between the first floor stairway landing and the main area.

The provisions of 36.2.7.2 should not be confused with those for open stairways as permitted by 36.3.1, Exception No. 1.

A.36.3.2.1 It is the intent to permit a suspended natural gas-fired unit heater that complies with the requirements of Section 9.2 to be installed and used in a mercantile occupancy without classifying the area in which it is located as hazardous.

A.36.3.2.2 The requirement for separating high hazard contents areas from other parts of the building is intended to isolate the hazard, and Exception No. 1 to 8.2.3.1.1 is applicable.

A.36.3.6.1 The intent of Exception No. 2 and Exception No. 3 to 36.3.6.1 is to permit spaces within single tenant spaces, or within buildings protected throughout by an approved, supervised automatic sprinkler system, to be open to the exit access corridor without separation.

A.36.4.4.1 Exception (b) The minimum requirement for terminating mall exit access in not less than 66 in. (168 cm) of egress width relates to the minimum requirement for not less than one aisle in Class A mercantile occupancies (30,000 ft² (2800 m²) or greater sales area) to be 5 ft (152 cm) in width.

A.36.4.4.1 Exception (e) Fire experience in covered mall shopping centers indicates that the most likely place of fire origin is in the tenant space where the combustible fire load is far greater than in the covered mall proper.

Furthermore, any fires resulting from the comparatively low fire load in the covered mall proper are more likely to be

detected and extinguished in their incipient stages. Early detection is likely due to the nature of the covered mall proper as a high traffic pedestrian way. Such fires produce less smoke development in a greater volume of space than fires in the more confined adjacent tenant space.

Smoke control systems that address fire experience in covered malls are necessary in order to achieve the following:

- (1) Ensure the integrity of the covered mall as a pedestrian way by maintaining it reasonably free of the products of combustion for a duration not less than that required to evacuate the building
- (2) Confine the products of combustion to the area of origin
- (3) Remove the products of combustion with a minimum of migration of such products of combustion from one tenant to another

Systems, or combinations of systems, that can be engineered to address fires in covered malls include the following:

- (1) Separate mechanical exhaust or control systems
- (2) Mechanical exhaust or control systems in conjunction with heating, ventilating, and air conditioning systems
- (3) Automatically or manually released gravity roof vent devices, such as skylights, relief dampers, or smoke vents
- (4) Combinations of items (1), (2), and (3) in this list, or any other engineered system designed to accomplish the purpose of this section

A.36.4.4.2.3 It is not the intent of 36.4.4.2.3 to require that large tenant spaces be considered anchor stores. A tenant space not considered in determining the occupant load of the mall is required to be arranged so that all of its means of egress will be independent of the covered mall.

A.36.4.4.2.5 Rooms opening onto the exit passageway are intended to include building service elevators, elevator machine rooms, electrical rooms, telephone rooms, janitor closets, restrooms, and similar normally unoccupied spaces not requiring hazardous area protection in accordance with Section 8.4.

A.36.4.5.3.2 An example of a high hazard commodity without protective containers is mineral spirits (flammable liquids) in plastic containers.

CHAPTER 37

A.37.2.2.2.2 The words “principal entrance/exit doors” describe doors that the authority having jurisdiction can reasonably expect to be unlocked in order for the facility to do business.

A.37.2.2.7 Exception To design egress from a covered mall building, the following steps should be used.

(a) The covered mall/pedestrian way has been assigned no occupant load, but it is required to be provided with means of egress sized to accommodate the total occupant load of the covered mall building based on the gross leasable area. The exits for the covered mall/pedestrian way are permitted to be provided by a combination of exterior exit doors and exit passageways.

(b) After completion of step (a), each tenant space is to be judged individually for occupant load and egress capacity. This step normally sends a portion or all (per 37.4.4.2.2) of the tenant space’s occupant load into the covered mall. Any remaining occupants are sent through the back of the tenant space into an exit passageway that might serve multiple tenant spaces and the covered mall.

(c) The width of the exit passageway is required to be sized for the most restrictive of the following:

- (1) For a width of not less than 66 in. (168 cm) per 37.4.4.1 Exception (b)
- (2) For the portion of the egress capacity from the largest single tenant space being served by the exit passageway
- (3) For the portion of the egress capacity from the covered mall being provided by the exit passageway

The concepts used in steps (a) through (c) include the following:

- (1) After proper egress capacity is provided for the covered mall/pedestrian way, each tenant space is then required to independently provide egress capacity for its occupants.
- (2) The covered mall required exit passageway width and the tenant space required exit passageway width are not required to be added together.
- (3) The required exit passageway width for a tenant space is not required to be added to that of other tenant spaces using the same exit passageway.

A.37.2.5.2 The purpose of 37.2.5.2 is to avoid pockets or dead ends of such size that they pose an undue danger of persons becoming trapped in case of fire.

It is recognized that dead ends exceeding the permitted limits exist and, in some cases, are impractical to eliminate. The authority having jurisdiction might permit such dead ends to continue to exist, taking into consideration any or all of the following:

- (1) Tenant arrangement
- (2) Automatic sprinkler protection
- (3) Smoke detection
- (4) Exit remoteness

A.37.2.5.3 It is recognized that common paths of travel exceeding the permitted limits exist and, in some cases, are impractical to eliminate. The authority having jurisdiction might permit such paths of travel to continue to exist, taking into consideration any or all of the following:

- (1) Tenant arrangement
- (2) Automatic sprinkler protection
- (3) Smoke detection
- (4) Exit remoteness

A.37.2.5.9 In order to eliminate the obstruction to the means of egress of the interior exit access and the exterior exit discharge, it is the intent to provide adequate area for transit and parking of wheeled carts or buggies used by customers. This area includes corral areas adjacent to exits that are constructed to restrict the movement of wheeled carts or buggies therefrom.

A.37.2.7.2 The basis for the exception to the general rule on complete enclosure of exits up to their point of discharge to the outside of the building is that, with the specified safeguards, reasonable safety is maintained.

A stairway is not considered to discharge through the street floor area if it leads to the street through a fire resistance-rated enclosure (exit passageway) separating it from the main area, even though there are doors between the first floor stairway landing and the main area.

The provisions of 37.2.7.2 should not be confused with those for open stairways as permitted by 37.3.1, Exception No. 1 and Exception No. 4.

A.37.3.2.1 It is the intent to permit a suspended natural gas-fired unit heater that complies with the requirements of Section 9.2 to be installed and used in a mercantile occupancy without classifying the area in which it is located as hazardous.

A.37.3.2.2 The requirement for separating high hazard contents areas from other parts of the building is intended to isolate the hazard, and Exception No. 1 to 8.2.3.1.1 is applicable.

A.37.4.4.1 Exception (b) The minimum requirement for terminating mall exit access in not less than 66 in. (168 cm) of egress width relates to the minimum requirement for not less than one aisle in Class A mercantile occupancies (30,000 ft² (2800 m²) or greater sales area) to be 5 ft (152 cm) in width.

A.37.4.4.1 Exception (e) Fire experience in covered mall shopping centers indicates that the most likely place of fire origin is in the tenant space where the combustible fire load is far greater than in the covered mall proper.

Furthermore, any fires resulting from the comparatively low fire load in the covered mall proper are more likely to be detected and extinguished in their incipient stages. Early detection is likely due to the nature of the covered mall proper as a high traffic pedestrian way. Such fires produce less smoke development in a greater volume of space than in the more confined adjacent tenant space.

Smoke control systems that address fire experience in covered malls are necessary in order to achieve the following:

- (1) Ensure the integrity of the covered mall as a pedestrian way by maintaining it reasonably free of the products of combustion for a duration not less than that required to evacuate the building
- (2) Confine the products of combustion to the area of fire origin
- (3) Remove the products of combustion with a minimum of migration of such products of combustion from one tenant to another

Systems, or combinations of systems, that can be engineered to address fires in covered malls include the following:

- (1) Separate or mechanical exhaust or control systems
- (2) Mechanical exhaust or control systems in conjunction with heating, ventilating, and air conditioning systems
- (3) Automatically or manually released gravity roof vent devices, such as skylights, relief dampers, or smoke vents
- (4) Combinations of items (1), (2), and (3) in this list, or any other engineered system designed to accomplish the purpose of this section

A.37.4.4.2.3 It is not the intent of 37.4.4.2.3 to require that large tenant spaces be considered anchor stores. A tenant space not considered in determining the occupant load of the mall is required to be arranged so that all of its means of egress will be independent of the covered mall.

A.37.4.4.2.5 Rooms opening onto the exit passageway are intended to include building service elevators, elevator machine rooms, electrical rooms, telephone rooms, janitor closets, restrooms, and similar normally unoccupied spaces not requiring hazardous area protection in accordance with Section 8.4.

A.37.4.5.3.2 An example of a high hazard commodity without protective containers is mineral spirits (flammable liquids) in plastic containers.

CHAPTER 38

A.38.1.1.1 Exception In determining equivalency for conversions, modernizations, renovations, or unusual design concepts of business occupancies, the authority having jurisdiction might *permit* evaluations based on NFPA 101A, *Guide on Alternative Approaches to Life Safety*, Chapter 7, utilizing the parameters for new construction.

A.38.2.2.2.2 The words “principal entrance/exit doors” describe doors that the authority having jurisdiction can reasonably expect to be unlocked in order for the facility to do business.

A.38.2.3.2 It is not the intent that this provision apply to non-corridor or nonpassageway areas of exit access, such as the spaces between rows of desks created by office layout or low-height partitions.

A.38.3.2.1 It is not the intent of this provision that rooms inside individual tenant spaces, used to store routine office supplies for that tenant, be required to be either separated or sprinklered.

A.38.3.2.2 The requirement for separating high hazard contents areas from other parts of the building is intended to isolate the hazard, and Exception No. 1 to 8.2.3.1.1 is applicable.

A.38.3.6.1 The intent of Exception No. 2 and Exception No. 3 to 38.3.6.1 is to permit spaces within single-tenant spaces, or within buildings protected throughout by an approved, supervised automatic sprinkler system, to be open to the exit access corridor without separation.

A.38.3.6.1 Exception No. 1 Where exits are available from an open floor area, such as open plan buildings, corridors are not required to be separated. An example of an open plan building is a building in which the work spaces and accesses to exits are delineated by the use of tables, desks, bookcases, or counters or by partitions that are less than floor-to-ceiling height.

A.38.3.6.1 Exception No. 2 It is the intent of this exception that a single tenant be limited to an area occupied under a single management and work the same hours. The concept is that people under the same employ working the same hours would likely be familiar with their entire tenant space. It is not the intent to apply this provision simply because tenants are owned by the same organization. For example, in a government-owned office building, the offices of different federal agencies would be considered multiple tenants because an employee normally works for one agency. The agencies might work various hours. Another example of multiple tenancy would be a classroom building of a university, since some classrooms might be in use at times when other classrooms are not being used.

A.38.4.2 In the design of high-rise buildings, special consideration should also be given to a life safety system including, but not limited to, the following features:

- (1) Movement of occupants to safety
- (2) Control of fire and smoke
- (3) Psychological features
- (4) Communications systems
- (5) Elevators
- (6) Emergency planning
- (7) Overall system reliability

CHAPTER 39

A.39.1.1.1 Exception In determining equivalency for business occupancies, the authority having jurisdiction might *permit* evaluations based on NFPA 101A, *Guide on Alternative Approaches to Life Safety*, Chapter 7, utilizing the parameters for existing buildings.

A.39.2.2.2.2 The words “principal entrance/exit doors” describe doors that the authority having jurisdiction can reasonably expect to be unlocked in order for the facility to do business.

A.39.2.5.2 It is recognized that dead ends exceeding the permitted limits exist and, in some cases, are impractical to eliminate. The authority having jurisdiction might permit such dead ends to continue to exist, taking into consideration any or all of the following:

- (1) Tenant arrangement
- (2) Automatic sprinkler protection
- (3) Smoke detection
- (4) Exit remoteness

A.39.2.5.3 It is recognized that common paths of travel exceeding the permitted limits exist and, in some cases, are impractical to eliminate. The authority having jurisdiction might permit such common paths of travel to continue to exist, taking into consideration any or all of the following:

- (1) Tenant arrangement
- (2) Automatic sprinkler protection
- (3) Smoke detection
- (4) Exit remoteness

A.39.3.2.1 It is not the intent of this provision that rooms inside individual tenant spaces, used to store routine office supplies for that tenant, be required to be separated or sprinklered.

A.39.3.2.2 The requirement for separating high hazard contents areas from other parts of the building is intended to isolate the hazard, and Exception No. 1 to 8.2.3.1.1 is applicable.

A.39.4.2.2 In some cases, appreciable cost might be involved in bringing an existing occupancy into compliance. Where this is true, it would be appropriate for the authority having jurisdiction to prescribe a schedule determined jointly with the facility, allowing suitable periods of time for the correction of the various deficiencies and giving due weight to the ability of the owner to secure the necessary funds.

CHAPTER 40

A.40.1.4.1(c) Additional information can be found in the annex for the definition of *Occupancy, Industrial, High Hazard* in A.3.3.134.8.2.

A.40.1.7 In most cases, the requirements for maximum travel distance to exits will be the determining factor rather than numbers of occupants, as exits provided to satisfy travel distance requirements will be sufficient to provide egress capacity for all occupants, except in cases of unusual arrangement of buildings or high occupant load of a general manufacturing occupancy.

A.40.2.2.5.2 The customary building code requirement for fire doors on both sides of an opening in a fire wall is permitted to be met by having an automatic-sliding fire door on one side, and a self-closing fire door swinging out from the other side of the wall. This arrangement qualifies only as a horizon-

tal exit from the side of the sliding door. For further information, see A.7.2.4.3.8.

A.40.2.5.5.1 Ancillary facilities located within industrial occupancies might include administrative office, laboratory, control, and employee service facilities that are incidental to the predominant industrial function and are of such size that separate occupancy classification is not warranted.

A.40.2.5.5.2 Occupants of ancillary facilities located within special purpose industrial occupancies might be required by administrative controls to remain in the facility when a fire occurs in the predominant industrial area so that they can perform an orderly shutdown of process equipment to control the spread of the fire and minimize damage to important equipment.

A.40.2.6.2(2) Smoke venting and heating venting should be in accordance with NFPA 204, *Guide for Smoke and Heat Venting*.

A.40.2.9 The authority having jurisdiction should review the facility and designate the stairs, aisles, corridors, ramps, and passageways that should be required to be provided with emergency lighting. In large locker rooms or laboratories using hazardous chemicals, for example, the authority having jurisdiction should determine that emergency lighting is needed in the major aisles leading through those spaces.

A.40.3.2 Emergency lighting should be considered where operations require lighting to perform orderly manual emergency operation or shutdown, maintain critical services, or provide safe start-up after a power failure.

A.40.6 For further information on aircraft hangars, see NFPA 409, *Standard on Aircraft Hangars*.

CHAPTER 42

A.42.1.7 There is no occupant load factor specified for storage occupancies. Rather, the actual probable maximum number of persons present needs to be considered in determining the occupant load.

A.42.2.2.5.2 The customary building code requirement for fire doors on both sides of an opening in a fire wall is permitted to be met by having an automatic-sliding fire door on one side and a self-closing fire door swinging out from the other side of the wall. This arrangement qualifies only as a horizontal exit from the side of the sliding door. For further information, see A.7.2.4.3.8.

A.42.2.6 The travel distance to exits specified recognizes a low population density. Consideration should be given to locating areas that have a relatively high population, such as lunchrooms, meeting rooms, packaging areas, and offices, near the outside wall of the building to keep the travel distance to a minimum.

A.42.2.6.3 Exception No. 2 The exception for extended travel distance in protected flammable and combustible liquids warehouses is addressed within the storage occupancy provisions rather than in the generalized high hazard contents provisions of Section 7.11. The 1996 edition of NFPA 30, *Flammable and Combustible Liquids Code*, represents an enhancement over earlier editions and is based on research. Where the protection is provided in accordance with the 1996 edition of NFPA 30, the increase in travel distance to 150 feet (45 m) is justified.

A.42.6 For further information on aircraft hangars, see NFPA 409, *Standard on Aircraft Hangars*.

A.42.7 For further information, see NFPA 61, *Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Products Facilities*. The egress requirements for storage elevators are based on the possibility of fire and are not based on the possibility of grain dust explosions.

A.42.8.1.1 For further information on garages, including a definition of *open garage*, see NFPA 88A, *Standard for Parking Structures*.

ANNEX B NONMANDATORY REFERENCED PUBLICATIONS

B-1 The following documents or portions thereof are referenced within this *Code* for informational purposes only and are thus not considered part of the requirements of this *Code* unless also listed in Chapter 2. The edition indicated here for each reference is the current edition as of the date of the NFPA issuance of this *Code*.

B-1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

NFPA 10, *Standard for Portable Fire Extinguishers*, 1998 edition.

NFPA 11, *Standard for Low-Expansion Foam*, 1998 edition.

NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems*, 2000 edition.

NFPA 12A, *Standard on Halon 1301 Fire Extinguishing Systems*, 1997 edition.

NFPA 13, *Standard for the Installation of Sprinkler Systems*, 1999 edition.

NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*, 1999 edition.

NFPA 13R, *Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height*, 1999 edition.

NFPA 14, *Standard for the Installation of Standpipe, Private Hydrant, and Hose Systems*, 2000 edition.

NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*, 1996 edition.

NFPA 17, *Standard for Dry Chemical Extinguishing Systems*, 1998 edition.

NFPA 22, *Standard for Water Tanks for Private Fire Protection*, 1998 edition.

NFPA 30, *Flammable and Combustible Liquids Code*, 1996 edition.

NFPA 58, *Liquefied Petroleum Gas Code*, 1998 edition.

NFPA 61, *Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Products Facilities*, 1999 edition.

NFPA 68, *Guide for Venting of Deflagrations*, 1998 edition.

NFPA 70, *National Electrical Code*[®], 1999 edition.

NFPA 72, *National Fire Alarm Code*[®], 1999 edition.

NFPA 80, *Standard for Fire Doors and Fire Windows*, 1999 edition.

NFPA 88A, *Standard for Parking Structures*, 1998 edition.

NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, 1999 edition.

NFPA 92A, *Recommended Practice for Smoke-Control Systems*, 1996 edition.

NFPA 92B, *Guide for Smoke Management Systems in Malls, Atria, and Large Areas*, 1995 edition.

NFPA 99, *Standard for Health Care Facilities*, 1999 edition.

NFPA 101A, *Guide on Alternative Approaches to Life Safety*, 1998 edition.

NFPA 105, *Recommended Practice for the Installation of Smoke-Control Door Assemblies*, 1999 edition.

NFPA 110, *Standard for Emergency and Standby Power Systems*, 1999 edition.

NFPA 170, *Standard for Fire Safety Symbols*, 1999 edition.

NFPA 204, *Guide for Smoke and Heat Venting*, 1998 edition.

NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances*, 2000 edition.

NFPA 220, *Standard on Types of Building Construction*, 1999 edition.

NFPA 241, *Standard for Safeguarding Construction, Alteration, and Demolition Operations*, 1996 edition.

NFPA 251, *Standard Methods of Tests of Fire Endurance of Building Construction and Materials*, 1999 edition.

NFPA 253, *Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source*, 2000 edition.

NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials*, 2000 edition.

NFPA 259, *Standard Test Method for Potential Heat of Building Materials*, 1998 edition.

NFPA 260, *Standard Methods of Tests and Classification System for Cigarette Ignition Resistance of Components of Upholstered Furniture*, 1998 edition.

NFPA 261, *Standard Method of Test for Determining Resistance of Mock-Up Upholstered Furniture Material Assemblies to Ignition by Smoldering Cigarettes*, 1998 edition.

NFPA 265, *Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Wall Coverings*, 1998 edition.

NFPA 266, *Standard Method of Test for Fire Characteristics of Upholstered Furniture Exposed to Flaming Ignition Source*, 1998 edition.

NFPA 267, *Standard Method of Test for Fire Characteristics of Mattresses and Bedding Assemblies Exposed to Flaming Ignition Source*, 1998 edition.

NFPA 269, *Standard Test Method for Developing Toxic Potency Data for Use in Fire Hazard Modeling*, 2000 edition.

NFPA 286, *Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth*, 2000 edition.

NFPA 307, *Standard for the Construction and Fire Protection of Marine Terminals, Piers, and Wharves*, 1995 edition.

NFPA 409, *Standard on Aircraft Hangars*, 1995 edition.

NFPA 501A, *Standard for Fire Safety Criteria for Manufactured Home Installations, Sites, and Communities*, 1999 edition.

NFPA 601, *Standard for Security Services in Fire Loss Prevention*, 2000 edition.

NFPA 701, *Standard Methods of Fire Tests for Flame Propagation Textiles and Films*, 1999 edition.

NFPA 705, *Recommended Practice for a Field Flame Test for Textiles and Films*, 1997 edition.

NFPA 914, *Recommended Practice for Fire Protection in Historic Structures*, 1994 edition.

NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*, 1999 edition.

NFPA 2001, *Standard on Clean Agent Fire Extinguishing Systems*, 2000 edition.

NFPA *Fire Protection Handbook*, 18th edition, 1991.

NFPA SPP-53, *Smoke Control in Fire Safety Design*, Butcher and Parnell.

B-1.2 Other Publications.

ACI 2/6R, *Guide for Determining the Fire Endurance of Concrete Elements*, American Concrete Institute, P.O. Box 9094, Farmington Hills, MI 48333.

ADAAG Americans with Disabilities Act Accessibility Guidelines.

AISI, *Designing Fire Protection for Steel Beams*, American Iron and Steel Institute, 1011 17th Street, NW, 13th floor, Washington, DC 20036.

AISI, *Designing Fire Protection for Steel Columns*, American Iron and Steel Institute, 1011 17th Street, NW, 13th floor, Washington, DC 20036.

AISI, *Designing Fire Protection for Steel Trusses*, American Iron and Steel Institute, 1011 17th Street, NW, 13th floor, Washington, DC 20036.

American Forest & Paper Association, *Design of Fire-Resistive Exposed Wood Members*, American Forest & Paper Association, 1111 19th Street, NW, Suite 800, Washington, DC 20036.

ANSI/BHMA A156.10, *American National Standard for Power Operated Pedestrian Doors*, American National Standards Institute, Inc., 11 West 42nd Street, 13th floor, New York, NY 10036.

ANSI/BHMA A156.19, *American National Standard for Power Assist & Low Energy Power Operated Doors*, American National Standards Institute, Inc., 11 West 42nd Street, 13th floor, New York, NY 10036.

ASHRAE *Guideline 5: Guideline for Commissioning Smoke Management Systems*, American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc., 1791 Tullie Circle, NE, Atlanta, GA 30329-2305.

ASHRAE *Handbook and Product Directory — Fundamentals*, American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc., 1791 Tullie Circle, NE, Atlanta, GA 30329-2305.

ASME/ANSI A17.1-1993, *Safety Code for Elevators and Escalators*, American National Standards Institute, Inc., 11 West 42nd Street, 13th floor, New York, NY 10036.

ASME A17.3-1993, *Safety Code for Existing Elevators and Escalators*, American National Standards Institute, Inc., 11 West 42nd Street, 13th floor, New York, NY 10036.

ASTM E 814-83, *Methods for Fire Tests of Through-Penetration Fire Stops*, American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM E 1355, *Standard Guide for Evaluating the Predictive Capability of Fire Models*, American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM E 1537, *Standard Method of Fire Testing of Real Scale Upholstered Furniture Items*, American Society of Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM E 1590, *Standard Method for Fire Testing of Real Scale Mattresses*, American Society of Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM F 1637, *Standard Practice for Safe Walking Surfaces*, American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM 1472, *Standard Guide for Documenting Computer Software*, American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

Australian Fire Engineering Guidelines, Fire Code Perform Centre, Limited, Sydney, Australia, 1996.

British Standard Firesafety Engineering in Buildings, DD240: Part 1, British Standards Institution, London, England, 1997.

CABO/ANSI A117.1-1992, *American National Standard for Accessible and Usable Buildings and Facilities*, American National Standards Institute, Inc., 11 West 42nd Street, 13th floor, New York, NY 10036.

16 *CFR* 1632.

16 *CFR* 1630, *Standard for the Surface Flammability of Carpets and Rugs*, FF 1-70.

28 *CFR* 31, Appendix A, Section 4.28, Alarms.

28 *CFR* 36, Appendix A, Sections 9.1.3, 9.1.5 and 9.2.2(8).

CMIFC, *Analytical Methods of Determining Fire Endurance of Concrete and Masonry Members — Model Code Approved Procedures*, Concrete and Masonry Industry Firesafety Committee, 5420 Old Orchard Road, Skokie, IL 60077-4321.

CRSI, *Reinforced Concrete Fire Resistance*, Concrete Reinforcing Steel Institute, 933 N. Plum Grove Road, Schaumburg, IL 60173-4753.

FF4-72, *Standard for the Flammability of Mattresses*.

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Kaplan *et al.*, *Journal of Fire Science*, 2 286-305 (1984).

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National Building Code, Building Officials and Code Administrators International, Inc., 4051 West Flossmoor Road, Country Club Hills, IL 60478-5795.

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PCI, *Design for Fire Resistance of Precast Prestressed Concrete*, Precast Prestressed Concrete Institute, 175 West Jackson Blvd., Chicago, IL 60604.

SFPE Engineering Guide to Performance-Based Fire Protection Analysis and Design of Buildings, Society of Fire Protection Engineers, Bethesda, MD, 1998.

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UBC, *Methods for Calculating Fire Resistance of Wood-Framed Walls, Floors and Roofs*, Uniform Building Code, 5360 South Workman Mill Road, Whittier, CA 90601.

UL *Fire Resistance Directory*, Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062.

UL 1975, *Standard for Fire Tests for Foamed Plastics Used for Decorative Purposes*, Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062.

UL 2079, *Test for Fire Resistance of Building Joint Systems*, 1st edition, 1994, Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062.

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Formal Interpretation

NFPA 101[®]
Life Safety Code[®]
2000 Edition

Reference: 7.1.3.2.1(d)
F.I. No.: 101-97-4

Background:

Case 1. A means of egress for a building's floors above the level of exit discharge (LED) has been designed to include an exit stair enclosure with a door that discharges directly to the outside at the LED. At the LED there is also a door that swings into the stair enclosure from the exit access corridor that serves the LED. As one of their required means of egress, occupants of the LED will travel from the exit access corridor into the exit stair enclosure and through the door to the outside.

Case 2. A means of egress for a building's floors above the level of exit discharge (LED) has been designed to include an exit stair enclosure with a door that discharges directly to the outside at the LED. The required means of egress from the building's LED will be fully met (independent of the stair enclosure) by a system employing doors directly from the corridor to the outside. Additionally, a "convenience" door will be installed in the corridor/stair enclosure wall on the LED for normal day-to-day use.

Question No. 1: With respect to Case 1, is it the intent to prohibit the means of egress from the LED that involves passing through the exit stair enclosure on the basis that 7.1.3.2.1(d) limits openings to those "necessary for access to the enclosure" (and, thus, require that the means of egress for the LED be redesigned so as not to use the exit stair because it wasn't necessary to design the egress system to pass through the stair enclosure)?

Answer: No.

Question No. 2: With respect to Case 2, is it the intent to prohibit the "convenience" door to/from the exit stair enclosure at the LED on the basis that 7.1.3.2.1(d) limits openings to those "necessary for access to the enclosure"?

Answer: No.

Issue Edition: 1997
Reference: 5-1.3.2.1(d)
Issue Date: August 2, 1999
Effective Date: August 22, 1999

Formal Interpretation

NFPA 101[®]
Life Safety Code[®]
2000 Edition

Reference: 18.3.6.3.5, 19.3.6.3.5, 18.3.7 and 19.3.7

F.I. No.: 101-97-5

Question No. 1: (18.3.6.3.5 and 19.3.6.3.5) Is it the intent of 18.3.6.3.5 and 19.3.6.3.5 to prohibit the application of push-plates, hardware, or other attachments on corridor doors in health care occupancies?

Answer: No.

Question No. 2: (18.3.7 and 19.3.7) Is it the intent of 18.3.7 and 19.3.7 to prohibit the application of push-plates, hardware, or other attachments on smoke barrier doors in health care occupancies?

Answer: No.

Issue Edition: 1997

Reference: 12-3.6.3.4, 13-3.6.3.4, 12-3.7 and 13-3.7

Issue Date: August 17, 1999

Effective Date: September 7, 1999

Formal Interpretation

NFPA 101[®]

Life Safety Code[®]

2000 Edition

**Reference: Section 11.7; 3.3.54 Emergency Access Opening;
3.3.197.12 Structure, Windowless**

F.I. No.: 101-97-6

Question No.: Is it the intent to permit a window, panel, or similar opening that cannot be opened by building occupants from the interior but can be opened from the exterior with normal fire department equipment to be considered an “emergency access opening” for purposes of applying the definition of a “windowless structure”?

Answer: No.

Issue Edition: 1997

Reference: 32-7.2 Access Openings and Windowless Structure

Issue Date: July 12, 2000

Effective Date: Aug 1, 2000

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