NFPA 101® Life Safety Code® 1985

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NFPA®
National Fire Protection Association Batterymarch Park, Quincy, MA 02269

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Policy Adopted by NFPA Board of Directors on December 3, 1982

The Board of Directors reaffirms that the National Fire Protection Association recognizes that the toxicity of the products of combustion is an important factor in the loss of life from fire. NFPA has dealt with that subject in its technical committee documents for many years.

There is a concern that the growing use of synthetic materials may produce more or additional toxic products of combustion in a fire environment. The Board has, therefore, asked all NFPA technical committees to review the documents for which they are responsible to be sure that the documents respond to this current concern. To assist the committees in meeting this request, the Board has appointed an advisory committee to provide specific guidance to the technical committees on questions relating to assessing the hazards of the products of combustion.

Statement on NFPA Procedures

This material has been developed under the published procedures of the National Fire Protection Association, which are designed to assure the appointment of technically competent Committees having balanced representation. While these procedures assure the highest degree of care, neither the National Fire Protection Association, its members, nor those participating in its activities accepts any liability resulting from compliance or noncompliance with the provisions given herein, for any restrictions imposed on materials or processes, or for the completeness of the text.

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SC FM 84

NFPA *101*®

Code for Safety to Life

from Fire in Buildings and Structures

1985 Edition

This 1985 edition of the *Life Safety Code*® was adopted by the National Fire Protection Association, Inc. on November 14, 1984 at its 1984 Fall Meeting in San Diego, California and was issued by the Standards Council on January 18, 1985, with an effective date of February 7. This 1985 edition supersedes the 1981 edition and all other previous editions.

Major changes from the 1981 edition include a reorganization of Section 1-4; a reorganization of Section 5-2 including revisions to smokeproof enclosures, revolving doors, turnstiles, the combining of requirements for interior and outside stairs, new provisions for stairway reentry and deletion of escalators and moving walks as egress components in new buildings; a rewrite of Section 6-3 on smoke dampers; a reorganization of Section 7-6 on detection, alarm and communication systems and related sections of each occupancy chapter; complete rewrites of Chapters 8, 9, 10 and 11 on assembly and educational occupancies, including changes in requirements for stages, aisle steps, projection rooms, sprinklers, alarm systems, underground structures, new provisions for adult day-care, revisions for child day-care and changes in open and flexible plan schools; new provisions for nonsleeping suites and gift shops in health care occupancies as well as a mandate for sprinkler protection in new high-rise health care facilities; deletion of special provisions for dormitories (formerly Sections 16-6 and 17-6) and new provisions for alarm systems, building subdivision and operable windows in hotels; deletion of special provisions for apartments for the elderly; a complete rewrite of Chapter 20 on lodging and rooming houses; the addition of a new Chapter 21 on board and care facilities and related Appendix F to assist in determining evacuation capability and Appendix G, a firesafety evaluation system (FSES) for board and care facilities; a rewrite of Section 22-2 on escape provisions for one- and two-family dwellings and apartment units; revisions to 24-2.5, 25-2.5, 26-2.5 and 27-2.5 on means of egress arrangement in mercantile and business occupancies; a rewrite of Section 29-8 on garages and a complete rewrite of the provisions for windowless and underground buildings in Chapter 30; the addition of a new Chapter 32 on referenced documents; a new Appendix D on alternate calculation for stair widths; and a new Appendix E giving a firesafety evaluation system (FSES) for detention and correctional occupancies. All significant changes in requirements have been identified by a vertical line in the margin. A cross reference index to the 1973, 1976, 1981 and 1985 editions has been included to assist the user.

This 1985 edition has been approved by the American National Standards Institute.

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(Alternate to R. R. Osman)
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(Alternate to W. G. Wells)

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Alternates

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This list represents the membership at the time the Committee was balloted on the text of this edition. Since that time, changes in the membership may have occurred.

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

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. For the first few years of its existence the Committee devoted its attention to a study of the notable fires involving loss of life and in 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, etc., which form the basis of the present *Code*. 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). A pamphlet, "Exit Drills in Factories, Schools, Department Stores and Theatres," published in 1912 following its presentation by the late Committee member Mr. R.H. Newbern at the 1911 Annual Meeting of the Association, although antedating the organization of the Committee, is considered as having the status of a Committee publication and had been used with the other pamphlets as a groundwork for the present *Code*. These pamphlets were widely circulated and put into quite general use.

In 1921 the Committee was enlarged to include representation of certain interested groups not previously participating, and work was started on the further development and integration of previous Committee publications to provide a comprehensive guide to exits and related features of life safety from fire in all classes of occupancy, to be 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.

The Cocoanut Grove Night Club fire in Boston in 1942 in which 492 lives were lost focused national attention upon the importance of adequate exits and related firesafety features. 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 Winecoff, Atlanta — 119 dead). The *Building Exits Code* thereafter was used to an increasing extent for legal regulatory purposes. However, the *Code* was not in suitable form for adoption into law, as it had been drafted as a reference document containing many advisory provisions useful to designers of buildings, but not appropriate 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 also involved adding to the *Code* provisions on many features in order to produce a complete document. Preliminary work 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 separate documents, NFPA 101B and NFPA 101C, were published on nursing homes and interior finish, respectively. NFPA 101C was revised in 1956. These publications have since been withdrawn.

In 1963 the Safety to Life Committee was reconstructed. The Committee was decreased in size to include only those having very broad knowledge in fire matters and representing all interested factions. 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 Safety to Life Committee 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 Life Safety from Fire in Buildings and Structures*, the text was put in "code language" and all explanatory notes were placed in an appendix. The contents of the *Code* were arranged in the same general order as contents of model building codes because the *Code* is used primarily as a supplement to building codes.

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 eleven 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. New chapters on Detention and

Correctional Facilities were added as well as new requirements for Atriums, Apartments for the Elderly, and Ambulatory Health Care Centers. The 1985 edition contains major editorial and technical changes in Section 5-2 on Means of Egress Components, a new Chapter 21 on Residential Board and Care Occupancies with related Appendices F and G, deletion of special provisions for housing for the elderly and dormitories, a new Appendix D on Alternative Calculations for Stair Width, and Appendix E, an FSES for Detention and Correctional Facilities.

In all of the work in developing the various sections of the *Code* the groups particularly concerned have been consulted. All public proposals have been reviewed and these proposals along with Committee proposals and the Committee's response to all proposals have been published by the NFPA for review by all concerned and any comments received have been discussed and many have been adopted by the Committee or at meetings of the NFPA. Records of the discussions and action taken by the NFPA will be found in the *Technical Committee Reports* and the *Technical Committee Documentation.*

The Committee welcomes comments and suggestions on the *Life Safety Code.* Any reader may file a request for consideration of changes. Such requests should be filed in writing, giving specific proposals and supporting data.

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 using the Life Safety Code Handbook 3rd edition, available from NFPA or by attending one of the seminars NFPA conducts on the Life Safety Code. Further information on these seminars is available through the division of Continuing Education of NFPA.

The *Code* essentially consists of five major parts. The first part consists of Chapters 1 through 7; these are often referred to as the base chapters or fundamental chapters. The next part consists of Chapters 8 through 30, which are the occupancy chapters. The third part consists of Chapter 31, on operating features. The fourth part is Chapter 32, on mandatory referenced publications, and the fifth and last part consists of Appendices A through G, which contain useful additional information.

A thorough understanding of Chapters 1 through 7 is necessary before using the *Code* as these chapters provide the "building blocks" upon which the occupancy chapters have built their requirements. It should be noted that many of the provisions of Chapters 1 through 7 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 5, the term "when permitted by Chapters 8 through 30" appears. When this does appear, that provision can be used only when specifically allowed by an occupancy chapter. For example, the provisions of 5-2.1.6 on special locking devices are allowed only when permitted by Chapters 8 through 30. Permission to use this special locking device is normally found in the "2.11" subsection of each occupancy chapter. For example, 8-2.11.1 Exception No. 2 specifically allows the use of these special locking arrangements in new assembly occupancies. If this permission is not found in an occupancy chapter, the special locking devices cannot be used. Similar types of restricted permission are found for such items as security grilles, double cylinder locks, special stairway reentry, revolving doors, atriums, etc. In other locations in the base chapters the term "unless prohibited by Chapters 8 through 30" 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 shall be regarded as the requirement, because the given equivalent value may be approximate.

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NFPA 101®

Code for Safety to Life from Fire in Buildings and Structures

1985 Edition

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

CHAPTER 1 ADMINISTRATION

SECTION 1-1 TITLE

1-1.1 This *Code* shall be known as the *Life Safety Code*, may be cited as such, and is referred to herein as "this *Code*" or "the *Code*."

SECTION 1-2 PURPOSE

1-2.1 The purpose of this *Code* is to establish minimum requirements that will provide a reasonable degree of safety from fire in buildings and structures.

1-2.2 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 insists upon compliance with a minimum standard for fire safety consistent with the public interest.

SECTION 1-3 SCOPE

1-3.1* This *Code* addresses life safety from fire and similar emergencies.

1-3.2 The *Code* addresses those construction, protection, and occupancy features necessary to minimize danger to life from fire, smoke, fumes, or panic.

1-3.3 The *Code* identifies the 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 the building.

1-3.4 The *Code* recognizes that life safety is more than a matter of egress and, accordingly, deals with other considerations that are essential to life safety.

1-3.5 Vehicles, vessels, or other mobile structures shall be treated as buildings when in fixed locations and occupied as buildings.

1-3.6 The *Code* does not attempt to address those general fire prevention or building construction features that are normally a function of fire prevention and building codes.

1-3.7 The prevention of accidental personal injuries during the course of normal occupancy of buildings, personal injuries incurred by an individual due to his own negligence, and the preservation of property from loss by fire have not been considered as the basis for any of the provisions of this *Code*.

SECTION 1-4 APPLICATION

1-4.1 The *Code* applies to both new construction and existing buildings. In various chapters there are specific provisions for existing buildings which may differ from those for new construction.

1-4.2 A limited but reasonable time shall be allowed for compliance with any part of this *Code* for existing buildings, commensurate with the magnitude of expenditure, disruption of services and degree of hazard.

1-4.3 The authority having jurisdiction shall determine the adequacy of means of egress and other measures for life safety from fire in accordance with the provisions of this *Code*.

1-4.4* The requirements for existing buildings may be modified if their application clearly would be impractical in the judgment of the authority having jurisdiction, but only when it is clearly evident that a reasonable degree of safety is provided.

1-4.5 Additions. Additions shall conform to the provisions for new construction.

1-4.6* Modernization or Renovation. Any alteration, or any installations of new equipment, shall be accomplished as nearly as practical in conformance with the requirements for new construction. Alterations shall not diminish the level of life safety below that which exists prior to the alteration. Life safety features which do not meet the requirements for new buildings but exceed the requirements for existing buildings shall not be further diminished. Life safety features in excess of those required for new construction are not required to be maintained. In no case shall the resulting life safety be less than that required for existing buildings.

1-4.7 Mixed Occupancies. Where two or more classes of occupancy occur in the same building or structure, and are so intermingled that separate safeguards are impracticable, means of egress facilities, construction, protection, and other safeguards shall comply with the most restrictive life safety requirements of the occupancies involved.

1-4.8 Where specific requirements contained in Chapters 8 through 30 differ from similar requirements contained in Chapters 1 through 7, the requirements of Chapters 8 through 30 shall govern.

1-4.9 Provisions in Excess of Code Requirements. Nothing in this *Code* shall be construed to prohibit a better type of building construction, more exits, or otherwise safer conditions than the minimum requirements specified in this *Code*.

SECTION 1-5 EQUIVALENCY CONCEPTS

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 to those prescribed by this *Code*, providing technical documentation is submitted to the authority having jurisdiction to demonstrate equivalency and the system, method, or device is approved for the intended purpose.

1-5.2 The specific requirements of this *Code* may be modified by the authority having jurisdiction to allow alternative arrangements that will secure as nearly equivalent safety to life from fire as practical, but in no case shall the modification afford less safety to life than, in the judgment of the authority having jurisdiction, that which would be provided with compliance with the corresponding provisions contained in this *Code*.

1-5.3 Buildings with alternative fire protection features accepted by the authority having jurisdiction shall be considered as conforming with the *Code*.

SECTION 1-6 OCCUPANCY (*See also Section 31-1.*)

1-6.1 No new construction or existing building shall be occupied in whole or in part in violation of the provisions of this *Code*.

1-6.2 Existing buildings that are occupied at the time of adoption of the *Code* may be continued in use provided:

(a) The occupancy classification remains the same.

(b) No serious life safety hazard exists that would constitute an imminent threat.

1-6.3* Buildings or portions of buildings may be occupied during construction, repair, alterations, or additions only if all means of egress and all fire protection features are in place and continuously maintained for the part occupied.

1-6.4 Changes of Occupancy. A change from one occupancy classification to another in any building or structure whether necessitating a physical alteration or not may be made only if such building or structure conforms with the requirements of this *Code* applying to new construction of the proposed new use.

CHAPTER 2
FUNDAMENTAL REQUIREMENTS

2-1* Every building or structure, new or old, designed for human occupancy shall be provided with exits sufficient to permit the prompt escape of occupants in case of fire or other emergency. The design of exits and other safeguards shall be such that reliance for safety to life in case of fire or other emergency will not depend solely on any single safeguard; additional safeguards shall be provided for life safety in case any single safeguard is ineffective due to some human or mechanical failure.

2-2 Every building or structure shall be so constructed, arranged, equipped, maintained and operated as to avoid undue danger to the lives and safety of its occupants from fire, smoke, fumes, or resulting panic during the period of time reasonably necessary for escape from the building or structure in case of fire or other emergency.

2-3 Every building or structure shall be provided with exits of kinds, numbers, location, and capacity appropriate to the individual building or structure, with due regard to the character of the occupancy, the number of persons exposed, the fire protection available, and the height and type of construction of the building or structure, to afford all occupants convenient facilities for escape.

2-4 In every building or structure, exits shall be so arranged and maintained as to provide free and unobstructed egress from all parts of the building or structure at all times when it is occupied. No lock or fastening shall be installed to prevent free escape from the inside of any building.

Exception: Locks shall be permitted in mental health, detention, or correctional facilities where supervisory personnel are continually on duty and effective provisions are made to remove occupants in case of fire or other emergency.

2-5 Every exit shall be clearly visible or the route to reach it shall be conspicuously indicated in such a manner that every occupant of every building or structure who is physically and mentally capable will readily know the direction of escape from any point. Each means of egress, in its entirety, shall be so arranged or marked that the way to a place of safety is indicated in a clear manner. Any doorway or passageway that is not an exit or a way to reach an exit, but is capable of being confused with an exit shall be so arranged or marked to prevent occupant confusion with acceptable exits. Every effort shall be taken to avoid occupants mistakenly traveling into dead-end spaces in a fire emergency.

2-6 When artificial illumination is required in a building or structure, exit facilities shall be included in the lighting design in an adequate and reliable manner.

2-7 Fire alarm facilities shall be provided, where necessary, to warn occupants of the existence of fire in every building or structure of such size, arrangement, or occupancy that a fire may not itself provide adequate occupant warning. Fire alarms will alert occupants to initiate escape. Fire alarms facilitate the orderly conduct of fire exit drills.

2-8 Two means of egress, as a minimum, shall be provided in every building or structure, section, or area where the size, occupancy, and arrangement endangers occupants attempting to use a single means of egress which is blocked by fire or smoke. The two means of egress shall be arranged to minimize the possibility that both may be impassable by the same fire or emergency condition.

2-9 Every vertical way of exit and other vertical opening between floors of a building shall be suitably enclosed or protected, as necessary, to afford reasonable safety to occupants while using exits and to prevent spread of fire, smoke, or fumes through vertical openings from floor to floor before occupants have entered exits.

2-10* Compliance with this *Code* shall not be construed as eliminating or reducing the necessity for other provisions for safety of persons using a structure under normal occupancy conditions. Also no provision of the *Code* shall be construed as requiring or permitting any condition that may be hazardous under normal occupancy conditions.

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 include the future; words used in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural the singular.

3-1.3 Where terms are not defined in this chapter, they shall have their ordinarily accepted meanings or such as the context may imply.

SECTION 3-2 DEFINITIONS

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

Apartment Building. (*See Section 18-1 or 19-1.*)

Approved.* Means "acceptable to the authority having jurisdiction."

Area. See Floor Area.

Arena Stage. A stage or platform open on at least three sides to audience seating. It may be with or without overhead scene handling facilities.

Assembly Occupancy. (*See Section 4-1.*)

Atrium. 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 communication facilities.

Authority Having Jurisdiction.* The "authority having jurisdiction" is the organization, office, or individual responsible for "approving" equipment, an installation, or a procedure.

Automatic. Providing a function without the necessity of human intervention.

Board and Care. (*See Section 21-1.*)

Building. Any structure used or intended for supporting or sheltering any use or occupancy. The term building shall be construed as if followed by the words "or portions thereof." (*See Structure.*)

Building, Existing. Any structure erected prior to the adoption of this *Code* or for which a permit for construction has been issued.

Business Occupancy. (*See Section 4-1.*)

Combustible. Capable of undergoing combustion.

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

Common Atmosphere (Educational Occupancies). (*See Section 10-1 or 11-1.*)

Correctional Occupancies. (*See Section 4-1.*)

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

Court, Enclosed. A court bounded on all sides by the exterior walls of a building or exterior walls and lot lines on which walls are allowable.

Critical Radiant Flux. The level of incident radiant heat energy on a floor covering system at the most distant flameout point as 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 (watts/cm^2).

Custodial Care Facility. (*See Section 12-1 or 13-1.*)

Day-Care Centers. (*See Section 10-7 or 11-7.*)

Detention Occupancies. (*See Section 4-1.*)

Dormitories. (*See Section 16-1 or 17-1.*)

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

Educational Occupancies. (*See Section 10-1 or 11-1.*)

Existing. That which is already in existence at the date when this *Code* goes into effect, as existing buildings, structures, or exit facilities.

Exit. That portion of a means of egress that is separated from all other spaces of the building or structure by construction or equipment as required in 5-1.3.1 to provide a protected way of travel to the exit discharge.

Exit Access. That portion of a means of egress which leads to an entrance to an exit.

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

Family Day-Care Home. (*See Section 10-9 or 11-9.*)

Fire Barrier. A fire barrier is a continuous membrane, either vertical or horizontal, such as a wall or floor assembly, that is designed and constructed with a specified fire resistance rating to limit the spread of fire and which will also restrict the movement of smoke. Such barriers may have protected openings. (*See 6-2.2.*)

Fire Compartment.* A fire compartment is a space within a building that is enclosed by fire barriers on all sides, including the top and bottom. (*See 6-2.2.*)

Fire Resistance Rating. 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 Fire Tests of Building Construction and Materials.*

Fire Window. A window assembly, including frame, wired glass, and hardware that under NFPA 257, *Standard for Fire Tests of Window Assemblies*, meets the fire protective requirements for the location in which it is to be used.

Flame Spread. The propagation of flame over a surface. (*See Section 6-5.*)

Flexible Plan Educational Buildings. (*See Section 10-1 or 11-1.*)

Floor Area, Gross. Gross floor area shall be 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. Where the term area is used elsewhere in this *Code*, it shall be understood to be gross area unless otherwise specified.

Floor Area, Net. Net floor area shall be the actual occupied area, not including accessory unoccupied areas or thickness of walls.

General Industrial Occupancies. (*See Section 28-1.*)

Group Day-Care Homes. (*See Section 10-8 or 11-8.*)

Guard. A vertical protective barrier erected along exposed edges of stairways, balconies, etc.

Handrail. A bar, pipe, or similar member designed to furnish persons with a handhold. (A handrail, if of suitable design, may also serve as part of a guard.)

Hazardous Areas. Areas of structures, buildings, or parts thereof, having a degree of hazard greater than that normal to the general occupancy of the building or structure, such as storage or use of combustibles or flammables, toxic, noxious, or corrosive materials or use of heat-producing appliances.

Health Care Occupancies. (*See Section 4-1.*)

High Hazard Areas. Areas of structures, buildings, or parts thereof used for purposes that involve highly combustible, highly flammable, or explosive products or materials that are likely to burn with extreme rapidity or that may produce poisonous fumes or gases, including highly toxic or noxious alkalies, acids, or other liquids or chemicals that involve flame, fume, explosive, poisonous or irritant hazards; also uses that cause division of material into fine particles or dust subject to explosion or spontaneous combustion, and uses that constitute a high fire hazard because of the form, character, or volume of the material used.

High Hazard Industrial Occupancy. (*See Section 28-1.*)

Horizontal Exit. (*See 5-1.2.5.*)

Hospital. (*See Section 12-1 or 13-1.*)

Hotel. (*See Section 16-1 or 17-1.*)

Industrial Occupancy. (*See Section 4-1.*)

Interior Finish. (*See Section 6-5.*)

Interior Floor Finish. (*See Section 6-5.*)

Interior Room (Educational Occupancies). (*See Section 10-1 or 11-1.*)

Limited-Combustible.* As applied to a building construction material, other than interior finish, means a material, not complying with the definition of noncombustible material, that, in the form in which it is used, has a potential heat value not exceeding 3500 Btu per lb (8.14×10^6 J/Kg), and complies with one of the following paragraphs (a) or (b).

Materials subject to increase in combustibility or flame spread rating beyond the limits herein established through the effects of age, moisture, or other atmospheric condition shall be considered combustible.

(a) Materials having a structural base of noncombustible material with a surfacing not exceeding a thickness of ⅛ in. (0.3 cm) that has a flame spread rating not greater than 50.

(b) Materials, in the form and thickness used, other than as described in (a), having neither a flame spread rating 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 rating greater than 25 nor evidence of continued progressive combustion.

Load, Live. The weight superimposed by the use and occupancy of the building, not including the wind load, earthquake load, or dead load.

Lodging Homes. (*See Section 20-1.*)

Means of Egress. (*See Section 5-1.*)

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.

Mercantile Occupancies. (*See Section 4-1.*)

Mezzanine. An intermediate level between the floor and ceiling of any story or room and covering not more than one-third of the floor area of the room or story in which it is located.

Noncombustible. A material which, in the form in which it is used, and, under the conditions anticipated, will not aid combustion or add appreciable heat to an ambient fire. Materials, when tested in accordance with ASTM E136, *Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C*, and conforming to the criteria contained in Section 6 of the referenced standard shall be considered as noncombustible.

Nursing Homes. (*See Section 12-1 or 13-1.*)

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

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

One- and Two-Family Dwellings. (*See Section 22-1.*)

Open Industrial Structures. (*See Section 28-1.*)

Open Plan Educational Buildings. (*See Section 10-1 or 11-1.*)

Outpatient (Ambulatory) Clinics. (*See Section 12-1 or 13-1.*)

Outside Stairs. Outside stairs include stairs in which at least one side is open to the outer air. (*See 5-2.2.*)

Place of Assembly. (*See Assembly Occupancy in Section 4-1.*)

Platform. (*See Section 8-1 or 9-1.*)

Plenum. An air compartment or chamber to which one or more ducts are connected and which forms part of an air distribution system.

Proscenium Wall. (*See Section 8-1 or 9-1.*)

Public Way. Any 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).

Ramp. An inclined floor surface. (*See 5-1.2.6 and 5-2.5.*)

Residential Occupancies. (*See Section 4-1.*)

Residential Board and Care. (*See Section 21-1.*)

Room (Educational Occupancies). (*See Section 10-1 or 11-1.*)

Rooming House. (*See Section 20-1.*)

Self-Closing. Equipped with an approved device which will ensure closing after having been opened.

Separate Atmosphere (Educational Occupancies). (*See Section 10-1 or 11-1.*)

Separate Means of Egress (Educational Occupancies). (*See Section 10-1 or 11-1.*)

Smoke Barrier. A smoke barrier is a continuous membrane, either vertical or horizontal, such as a wall, floor, or ceiling assembly, that is designed and constructed to restrict the movement of smoke. A smoke barrier may or may not have a fire resistance rating. Such barriers may have protected openings. (*See Section 6-3.*)

Smoke Compartment.* A smoke compartment is a space within a building enclosed by smoke barriers or fire barriers on all sides, including the top and bottom. (*See Section 6-3.*)

Smoke Detector. A device which senses visible or invisible particles of combustion.

Special Purpose Industrial Occupancies. (*See Section 28-1.*)

Stage. (*See Section 8-1 or 9-1.*)

Storage Occupancy. (*See Section 4-1.*)

Stores. (*See Section 24-1 or 25-1.*)

Story. That portion of a building included between the upper surface of a floor and the upper surface of the floor or roof next above.

Street. Any public thoroughfare (street, avenue, boulevard) 30 ft (9.1 m) or more in width that has been dedicated or deeded to the public for public use and is accessible for use by the fire department in fighting fire. Enclosed spaces and tunnels, even though used for vehicular and pedestrian traffic, are not considered as streets for the purposes of the *Code*.

Street Floor. Any story or floor level accessible from the street or from outside the building at ground level with floor level at main entrance not more than three risers above or below ground level at these points, and so arranged and utilized as to qualify as the main floor. Where, due to differences in street levels, there are two or more stories accessible from the street, each is a street floor for the purposes of the *Code*. Where there is no floor level within the specified limits for a street floor above or below ground level, the building shall be considered as having no street floor.

Structure. That which is built or constructed. The term structure shall be construed as if followed by the words "or portion thereof." (*See Building.*)

Thrust Stage. (*See Section 8-1 or 9-1.*)

Unit of Exit Width. (*See Section 5-3.*)

Vertical Opening. An opening through a floor or roof.

Yard. An open, unoccupied space other than a court, unobstructed from the ground to the sky, except where specifically provided by the *Code*, on the lot on which a building is situated.

CHAPTER 4 CLASSIFICATION OF OCCUPANCY AND HAZARD OF CONTENTS

SECTION 4-1 CLASSIFICATION OF OCCUPANCY

4-1.1* A building or structure shall be classified as follows, subject to the ruling of the authority having jurisdiction in case of question as to proper classification in any individual case.

4-1.2* Assembly (*for requirements see Chapters 8 and 9*). Assembly occupancies include, but are not limited to, all buildings or portions of buildings used for gathering together 50 or more persons for such purposes as deliberation, worship, entertainment, eating, drinking, amusement, or awaiting transportation. Assembly occupancies include:

Theaters	Dance halls
Motion picture theaters	Club rooms
Assembly halls	Passenger stations and terminals
Auditoriums	of air, surface, underground,
Exhibition halls	and marine public transporta-
Museums	tion facilities
Libraries	Recreation piers
Skating rinks	Courtrooms
Gymnasiums	Conference rooms
Bowling lanes	Drinking establishments
Pool rooms	Mortuary chapels
Armories	College and university class-
Restaurants	rooms, 50 persons and over
Churches	

Occupancy of any room or space for assembly purposes by less than 50 persons in a building of other occupancy and incidental to such other occupancy shall be classed as part of the other occupancy and subject to the provisions applicable thereto.

4-1.3* Educational (*for requirements see Chapters 10 and 11*). Educational occupancies include all buildings used for the gathering of groups of 6 or more persons for purposes of instruction. Educational occupancies include:

Schools	Nursery schools
Academies	Kindergartens

Educational occupancies also include day-care facilities (*see Sections 10-7, 10-8, 10-9; 11-7, 11-8, 11-9*).

Other occupancies associated with educational institutions shall be in accordance with the appropriate parts of this *Code*.

Exception: Licensed day-care facilities shall include those of any capacity.

In cases where instruction is incidental to some other occupancy, the section of this *Code* governing such other occupancy shall apply.

4-1.4 Health Care (*for requirements see Chapters 12 and 13*). Health care occupancies are those used for purposes such as medical or other treatment or care of persons suffering from physical or mental illness, disease or infirmity; and for the care of infants, convalescents, or infirm aged persons. Health care occupancies provide sleeping facilities for the occupants or are occupied by persons who are mostly incapable of self-preservation because of age, physical or mental disability, or because of security measures not under the occupants' control.

Health care occupancies include:

(a) Hospitals

(b) Nursing homes

(c) Custodial care facilities

Nurseries
Homes for the infirm aged
Mentally retarded care institutions

Health care occupancies also include:

(a) Supervisory care facilities

(b) Ambulatory care facilities (*see Sections 12-6 and 13-6*).

4-1.5 Detention and Correctional Occupancies (*for requirements see Chapters 14 and 15*). Detention and correctional occupancies (also known as Residential-Restrained Care Institutions) are those used to house occupants under some degree of restraint or security. Detention and correctional occupancies are occupied by persons who are mostly incapable of self-preservation because of security measures not under the occupants' control.

Detention and correctional occupancies include:

Residential-restrained care	Jails
Penal institutions	Detention centers
Reformatories	Correctional centers

4-1.6 Residential (*for requirements see Chapters 16 through 23*). Residential occupancies are those occupancies in which sleeping accommodations are provided for normal residential purposes and include all buildings designed to provide sleeping accommodations.

Exception: Those classified under Health Care or Detention and Correctional Occupancies.

Residential occupancies are treated separately in this *Code* in the following groups:

(a) Hotels (*Chapters 16 and 17*)

Motels
Dormitories
Orphanages for age 6 years and older

(b) Apartments (*Chapters 18 and 19*)

(c) Lodging or rooming houses (*Chapter 20*)

(d) Board and care facilities (*Chapter 21*)

(e) One- and two-family dwellings (*Chapter 22*)

4-1.7* Mercantile (*for requirements see Chapters 24 and 25*). Mercantile occupancies include stores, markets, and other rooms, buildings, or structures for the display and sale of merchandise. Included in this occupancy group are:

Supermarkets	Shopping centers
Department stores	Drugstores
Auction rooms	

Minor merchandising operations in buildings predominantly of other occupancies, such as a newsstand in an office building, shall be subject to the exit requirements of the predominant occupancy.

4-1.8* Business (*for requirements see Chapters 26 and 27*). Business occupancies are those used for the transaction of business (other than that covered under Mercantile), for the keeping of accounts and records, and similar purposes. Included in this occupancy group are:

Doctors' offices
Dentists' offices
City halls
General offices
Town halls
Courthouses
Outpatient clinics, ambulatory
College and university-instructional buildings, classrooms under 50 persons, and instructional laboratories

Minor office occupancy incidental to operations in another occupancy shall be considered as a part of the predominating occupancy and shall be subject to the provisions of this *Code* applying to the predominating occupancy.

4-1.9 Industrial (*for requirements see Chapter 28*). Industrial occupancies include factories making products of all kinds and properties devoted to operations such as processing, assembling, mixing, packaging, finishing or decorating, and repairing, including, among others, the following:

Factories of all kinds
Laboratories
Dry cleaning plants
Power plants
Pumping stations
Smokehouses
Laundries
Creameries
Gas plants
Refineries
Sawmills
College and university non-instructional laboratories

4-1.10* Storage (*for requirements see Chapter 29*). Storage occupancies include all buildings or structures utilized primarily for the storage or sheltering of goods, merchandise, products, vehicles, or animals. Included in this occupancy group are:

Warehouses
Cold storage
Freight terminals
Truck and marine terminals
Bulk oil storage
Parking garages
Hangars
Grain elevators
Barns
Stables

Minor storage incidental to another occupancy shall be treated as part of the other occupancy.

4-1.11 Unusual Structures. Occupancies in unusual structures include any building or structure which cannot be properly classified in any of the preceding occupancy groups, either by reason of some function not encompassed or some unusual combination of functions necessary to the purpose of the building or structure. Such miscellaneous buildings and structures shall conform to the fundamental principles stated in Chapter 2 of this *Code* and to any specific provisions applicable thereto in Chapter 30.

4-1.12 Mixed Occupancies (*see 1-4.7*).

SECTION 4-2 HAZARD OF CONTENTS

4-2.1 General.

4-2.1.1 The hazard of contents, for the purpose of this *Code*, 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.

4-2.1.2 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.

4-2.1.3* Where different degrees of hazard of contents exist in different parts of a building or structure, the most hazardous shall govern the classification for the purpose of this *Code*.

Exception: Where hazardous areas are segregated or protected, as specifed in Section 6-4 and the applicable sections of Chapters 8 through 30.

4-2.2 Classification of Hazard of Contents.

4-2.2.1* The hazard of contents of any building or structure shall be classified as low, ordinary, or high in accordance with 4-2.2.2, 4-2.2.3 and 4-2.2.4.

4-2.2.2* Low hazard contents shall be classified as those of such low combustibility that no self-propagating fire therein can occur and that, consequently, the only probable danger requiring the use of emergency exits will be from panic, fumes, smoke, or fire from some external source.

4-2.2.3* Ordinary hazard contents shall be classified as those which are liable to burn with moderate rapidity or to give off a considerable volume of smoke but from which neither poisonous fumes nor explosions are to be feared in case of fire.

4-2.2.4* High hazard contents shall be classified as those which are liable to burn with extreme rapidity or from which poisonous fumes or explosions are to be feared in the event of fire. (*For means of egress requirements see Section 5-11.*)

CHAPTER 5 MEANS OF EGRESS

(See also Chapter 31.)

SECTION 5-1 GENERAL

5-1.1 Application.

5-1.1.1* Means of egress for both new and existing buildings shall comply with this chapter. (*Also see Section 31-1.*)

5-1.1.2 Any alteration or addition that would reduce means of egress below the requirements of this *Code* is prohibited.

5-1.1.3 Any change of occupancy that would result in means of egress below the requirements of this *Code* is prohibited.

5-1.2 Definitions.

5-1.2.1 Means of Egress. A means of egress is a continuous and unobstructed way of exit travel from any point in a building or structure to a public way and consists of three separate and distinct parts: (a) the exit access, (b) the exit, and (c) the exit discharge. A means of egress comprises the vertical and horizontal travel and shall include intervening room spaces, doorways, hallways, corridors, passageways, balconies, ramps, stairs, enclosures, lobbies, escalators, horizontal exits, courts, and yards.

5-1.2.2 Exit Access. Exit access is that portion of a means of egress which leads to an entrance to an exit.

5-1.2.3* Exit. Exit is that portion of a means of egress which is separated from all other spaces of the building or structure by construction or equipment as required in 5-1.3.1 to provide a protected way of travel to the exit discharge.

5-1.2.4 Exit Discharge. Exit discharge is that portion of a means of egress between the termination of an exit and a public way.

5-1.2.5* Horizontal Exit. A horizontal exit is 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 from the area of incidence and areas communicating therewith (*see 5-2.4*).

5-1.2.6 Ramp. A ramp is a walking surface in an accessible space that has a running slope greater than 1:20.

5-1.3 Separation of Means of Egress (*see also Section 6-2*).

5-1.3.1 When an exit is required to be protected by separation from other parts of the building by some requirement of this *Code*, the separating construction shall meet the requirements of Section 6-2 and the following requirements:

(a) The separation shall have at least a 1-hour fire resistance rating when the exit connects three stories or less. This applies whether the stories connected are above or below the story at which exit discharge begins.

Exception to (a): Existing apartment buildings in accordance with 19-3.1.1 Exception No. 3.

(b) The separation shall have at least a 2-hour fire resistance rating when the exit connects four or more stories, whether above or below the level of exit discharge. It shall be constructed of an assembly of noncombustible or limited-combustible materials and shall be supported by construction having at least a 2-hour fire resistance rating.

Exception to (b): Apartment buildings in accordance with 18-3.1.1 Exception No. 3 and 19-3.1.1 Exception No. 3.

(c) Any opening therein shall be protected by an approved self-closing fire door (*also see 5-2.1.8*).

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

5-1.3.2 No exit enclosure shall be used for any purpose which would interfere with its use as an exit, such as for storage or similar purposes. (*Also see 5-2.2.3.4.*)

5-1.3.3* Corridors used as exit access and serving an area having an occupant load of more than 30 shall be separated from other parts of the building by construction having at least a 1-hour fire resistance rating. Openings in such separations shall be protected by an approved fire door assembly having a fire protection rating of at least 20 minutes when tested in accordance with NFPA 252, *Standard Methods of Fire Tests of Door Assemblies*, without the hose stream test. Such door shall be designed and installed to minimize smoke leakage.

Exception No. 1: Existing buildings.

Exception No. 2: Where requirements differ in Chapters 8 through 30.

5-1.4 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. Chapters 8 through 30 governing individual occupancies may impose further limitations.

5-1.5* Headroom. Means of egress shall be so designed and maintained as to provide adequate headroom as provided in other sections of this *Code* (*see 5-2.2.2.1*) but in no case shall the ceiling height be less than 7 ft 6 in. (229 cm) nor any projection from the ceiling be less than 6 ft 8 in. (203 cm) nominal height from the floor.

Exception: In existing buildings, the ceiling height shall not be less than 7 ft (213 cm) from the floor with no projection below a 6 ft 8 in. (203 cm) nominal height from the floor.

5-1.6 Changes in Elevation. Changes in elevation in areas constituting part of a means of egress shall be by stairs or by ramps.

Exception: Changes in elevation that do not exceed 21 in. (53.3 cm) shall be by ramps.

5-1.7 Workmanship, Impediments to Egress.

5-1.7.1 Doors, stairs, ramps, passageways, signs, and all other components of means of egress shall be of substantial, reliable construction and shall be built or installed in a workmanlike manner.

5-1.7.2 Any device or alarm installed to restrict the improper use of a means of egress shall be so designed and installed that it cannot, even in case of failure, impede or prevent emergency use of such means of egress (*also see 5-2.1.6*).

Exception: In detention and correctional occupancies as provided in Chapters 14 and 15.

5-1.7.3* Means of egress shall be free of obstructions which would prevent its use.

SECTION 5-2 MEANS OF EGRESS COMPONENTS

5-2.1 Doors.

5-2.1.1 General.

5-2.1.1.1 A door assembly, including the doorway, frame, door, and necessary hardware, may be used as a component in a means of egress when it conforms to the general requirements of Section 5-1 and to the special requirements of this subsection. As such, the assembly is designated as a door.

5-2.1.1.2 Every door and every principal entrance that is required to serve as an exit shall be so designed and constructed that the way of exit travel is obvious and direct. Windows that, because of their physical configuration or design and the materials used in their construction, could be mistaken for doors shall be made inaccessible to the occupants by barriers or railings conforming to the requirements of 5-2.2.6.

5-2.1.1.3 For the purpose of Section 5-2, unless otherwise provided by Chapters 8 through 30, a building is occupied at any time it is open to or accessible to the public or at any other time it is occupied by more than 10 persons.

5-2.1.2 Units of Exit Width.

5-2.1.2.1* In determining the units of exit width for a doorway, only the clear width of the doorway when the door is in the full open position shall be measured. Clear width shall be the net, unobstructed width of the door opening without projections into such width.

Exception: In existing buildings, projections into the door opening by stops or by the hinge stile shall be permitted.

5-2.1.2.2 Where a doorway is divided by mullions, the allowable units of exit width for the entire doorway shall be the sum of the units of exit width calculated separately for each individual door in the opening.

5-2.1.3 Width and Floor Level.

5-2.1.3.1* No door opening in the means of egress shall be less than 32 in. (81 cm) in clear width.

Exception No. 1: In existing buildings no single door in a doorway shall be less than 28 in. (71 cm) wide.

Exception No. 2: In detention and correctional occupancies as provided in Chapters 14 and 15.

Exception No. 3: Interior doors within dwelling units as provided in Chapter 22.

5-2.1.3.2 No single door in a doorway shall exceed 48 in. (122 cm) in width.

5-2.1.3.3 The floor on both sides of a door shall be substantially level and shall have the same elevation on both sides of the door, for a distance on each side at least equal to the width of the widest single door.

Exception: In one- and two-family dwellings and in existing buildings when the door discharges to the outside or to an exterior balcony, exterior exit, or exterior exit access, the floor level outside the door may be one step lower than the inside but not more than 8 in. (20.3 cm) lower.

5-2.1.4 Swing and Force to Open.

5-2.1.4.1* Any door in a means of egress shall be of the side-hinged, swinging type. The door shall be so designed and installed that it shall be capable of swinging from any position to the full use of the opening in which it is installed. Doors shall swing in the direction of exit travel:

(a) When used in an exit enclosure, or

(b) When serving a high hazard area, or

(c) When serving an occupant load of 50 or more.

Exception No. 1: Sliding doors in detention and correctional occupancies as provided in Chapters 14 and 15, and doors for dwelling units as provided in Chapter 22.

Exception No. 2: Smoke barrier door swing in existing health care occupancies as provided in Chapter 13.

Exception No. 3: Where permitted by Chapters 8 through 30, horizontal sliding or vertical rolling security grilles or doors that are a part of the required means of egress shall conform to the following:

(a) They must remain secured in the full open position during the period of occupancy by the general public.

(b) There shall be a readily visible, durable sign on or adjacent to the door stating THIS DOOR TO REMAIN OPEN WHEN THE BUILDING IS OCCUPIED. The sign shall be in letters not less than 1 in. (2.5 cm) high on a contrasting background.

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

(d) Doors or grilles shall be openable from within the space without the use of any special knowledge or effort.

(e) When two or more means of egress are required, not more than half of the means of egress may be equipped with horizontal sliding or vertical rolling grilles or doors.

Exception No. 4: An elevator lobby which is not a part of the exit access system for the remainder of the story may be provided with an approved self-closing or automatic-closing horizontal sliding door. (See 5-2.1.12.)

5-2.1.4.2* During its swing, any door in a means of egress shall not reduce the unobstructed width of an aisle, corridor, passageway, stair or stair landing to less than one-half its required width. When fully open, the door shall not project more than 3½ in. (8.9 cm) into the required width of a stair or stair landing nor more than 7 in. (17.8 cm) into the required width of an aisle, corridor or passageway.

Exception: In existing buildings, a door giving access to a stairway shall neither reduce the unobstructed width of a stair or landing to less than one unit of exit width nor, when open, interfere with the full use of the stairs.

5-2.1.4.3 The forces required to fully open any door manually in a means of egress shall not exceed a 15 lbf (67 N) to release the latch, a 30 lbf (133 N) to set the door in motion and a 15 lbf (67 N) to open the door to the minimum required width. These forces shall be applied at the latch stile.

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

Exception No. 2: In detention and correctional occupancies as provided in Chapters 14 and 15.

5-2.1.4.4* Screen and Storm Doors. No screen door or storm door in connection with any required exit shall swing against the direction of exit travel in any case where doors are required to swing with the exit travel.

5-2.1.5 Locks, Latches, Alarm Devices.

5-2.1.5.1 A door shall be so arranged as to be readily opened from the side from which egress is to be made at all times when the building served thereby is occupied. Locks, if provided, shall not require the use of a key, tool, special knowledge or effort for operation from the inside of the building.

Exception No. 1: In health care occupancies as provided in Chapters 12 and 13, and in detention and correctional occupancies as provided in Chapters 14 and 15.

Exception No. 2: Exterior doors may have key operated locks from the egress side provided:

(a) There is a readily visible, durable sign on the egress side on or adjacent to the door stating THIS DOOR TO REMAIN UNLOCKED WHEN THE BUILDING IS OCCUPIED. The sign shall be in letters not less than 1 in. (2.5 cm) high on a contrasting background, and

(b) The locking device is of a type that is readily distinguishable as locked, and

(c) This Exception is specifically permitted by Chapters 8 through 30 for the specific occupancy.

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

(e) This Exception may be revoked by the authority having jurisdiction for cause.

Exception No. 3: When permitted by Chapters 8 through 30, key operation is allowed provided the key cannot be removed when the door is locked from the side from which egress is to be made.

5-2.1.5.2* Every stairwell door shall allow reentry from the stairwell to the interior of the building or an automatic release shall be provided to unlock all stairwell doors to allow reentry. Such automatic release shall be actuated with the initiation of the building fire alarm system.

Exception No. 1: Selected doors on stairwells may be equipped with hardware that prevents reentry into the interior of the building provided that:

(a) Such arrangement is specifically permitted by Chapters 8 through 30, and

(b) There are at least two levels where it is possible to leave the stairwell, and

(c) There shall be not more than four floors intervening between floors where it is possible to leave the stairwell, and

(d) Reentry is possible on the top or next to top floor permitting access to another exit, and

(e) Doors permitting reentry are identified as such on the stairwell side of the door.

Exception No. 2: In new health care occupancies as provided in Chapter 12, and in new detention and correctional occupancies as provided in Chapter 14.

Exception No. 3: Existing installations as permitted by Chapters 8 through 30.

5-2.1.5.3* A latch or other fastening device on a door shall be provided with a knob, handle, panic bar, or other simple type of releasing device, the method of operation of which is obvious, even in darkness.

5-2.1.5.4 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 which depend upon the releasing of one door before the other shall not be used.

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

5-2.1.5.5 No lock, padlock, hasp, bar, chain, or other device, or combination thereof, shall be installed or maintained at any time on or in connection with any door on which panic hardware or fire exit hardware is required by this *Code* if such device prevents or is intended to prevent the free use of the door for purposes of egress.

5-2.1.6 Special Locking Arrangements.

5-2.1.6.1 In buildings protected throughout by an approved supervised automatic fire detection system or approved supervised automatic sprinkler system and when permitted by Chapters 8 through 30, doors in low and ordinary hazard areas, as defined by 4-2.2, may be equipped with approved, listed, locking devices which shall:

(a) Unlock upon actuation of an approved supervised automatic fire detection system or approved supervised automatic sprinkler system installed in accordance with Section 7-6 or 7-7, and

(b) Unlock upon loss of power controlling the lock or locking mechanism, and

(c) Initiate an irreversible process which will release the lock within 15 seconds whenever a force of not more than 15 lb (67 N) is continuously applied, for a period of not more than three seconds to the release device required in 5-2.1.5.3. Relocking of such doors shall be by manual means only. Operation of the release device shall activate a signal in the vicinity of the door for assuring those attempting to exit that the system is functional.

Exception to (c): The authority having jurisdiction may approve a delay not to exceed 30 seconds provided that reasonable life safety is assured.

5-2.1.6.2* A sign shall be provided on the door adjacent to the release device which reads:

PUSH UNTIL ALARM SOUNDS.
DOOR CAN BE OPENED IN 15 SECONDS.

Sign letters shall be at least 1 in. (2.5 cm) high and ⅛ in. (0.3 cm) wide stroke.

5-2.1.6.3 Emergency lighting in accordance with Section 5-9 shall be provided at the door.

5-2.1.7 Panic Hardware and Fire Exit Hardware.

5-2.1.7.1 Panic hardware and fire exit hardware consist of a door latching assembly incorporating a device which releases the latch upon the application of a force in the direction of exit travel. Fire exit hardware additionally provides fire protection when used as part of a fire door assembly.

5-2.1.7.2 When a door is required to be equipped with panic hardware or fire exit hardware by some other provision of this *Code*, such releasing device shall:

(a) Consist of bars or panels, the actuating portion of which shall extend across not less than one-half of the width of the door leaf, not less than 30 in. (76 cm) nor more than 44 in. (112 cm) above the floor, and

(b) Cause the door latch to release when a force not to exceed 15 lb (67 N) is applied.

5-2.1.7.3 Only approved panic hardware shall be used on doors which are not fire doors. Only approved fire exit hardware shall be used on fire doors.

5-2.1.7.4 Required panic hardware and fire exit hardware shall not be equipped with any locking device, set screw, or other arrangement which can be used to prevent the release of the latch when pressure is applied to the bar. Devices which hold the latch in the retracted position are prohibited on fire exit hardware unless listed and approved for such use.

Exception: In detention and correctional occupancies as provided in Chapters 14 and 15.

5-2.1.8 Self-Closing Devices. A door designed to be kept normally closed in a means of egress, such as a door to a stair enclosure or horizontal exit, shall be a self-closing door and shall not at any time be secured in the open position. (*Also see 5-10.4.2.2.*)

Exception: In any building of low or ordinary hazard contents, as defined in 4-2.2.2 and 4-2.2.3, where permitted by Chapters 8 through 30, or where the authority having jurisdiction approves the installation and finds that the circumstances are such that reasonable life safety from fire and smoke is not endangered thereby, stairway doors, doors in smoke barriers, and doors in horizontal exits may be automatic closing, where:

(a) Upon release, the door becomes self-closing; and

(b) An approved release device is provided, so arranged that any interruption of the hold-open feature will cause the door to be released; and

(c) The release device is so designed that the door may be instantly released manually and upon release become self-closing or the door may be closed by some simple or readily obvious operation; and

(d) The automatic releasing mechanism or medium is activated by (1) the operation of an approved automatic smoke detection system installed to protect the entire building, so designed and installed as to provide for actuation of the system so promptly as to preclude the generation of heat or smoke sufficient to interfere with egress before the system operates, or (2) the operation of approved smoke detectors installed in such a way as to detect smoke on either side of the door opening, as detailed in NFPA 72E, Standard on Automatic Fire Detectors, Section 8-2. In addition, the operation of an approved automatic sprinkler system which protects the entire building, if provided, shall also cause the door to close but does not substitute for smoke actuation. The above systems may be zoned as approved by the authority having jurisdiction; and

(e) Any sprinkler or fire detection system or smoke detector is provided with such supervision and safeguards as are necessary to assure complete reliability of operation in case of fire. (See also Section 7-6.)

5-2.1.9 Powered-Operated Doors.

5-2.1.9.1 Where required doors are operated by power, such as doors with photoelectric-actuated mechanism to open the door upon the approach of a person or doors with power-assisted manual operation, the design shall be such that in event of power failure the door may be opened manually to permit exit travel or closed where necessary to safeguard means of egress. The forces required to open these doors manually shall not exceed those specified in 5-2.1.4.3 except that the force to set the door in motion shall not exceed 50 lbf (222 N). The door shall be so designed and installed 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 opening in which it is installed. (*See 5-2.1.4.1.*)

5-2.1.9.2 If a power-operated door is to be accepted as a required exit, it shall also swing with the exit travel by manual means.

Exception: In detention and correctional occupancies as provided in Chapters 14 and 15.

5-2.1.10 Revolving Doors.

5-2.1.10.1 All revolving doors shall comply with the following:

(a) Revolving doors shall be capable of being collapsed into a book-fold position.

Exception to (a): Existing revolving doors where approved by the authority having jurisdiction.

(b) When in the book-fold position the parallel egress paths formed shall provide an aggregate width of 36 in. (91 cm).

Exception to (b): Existing revolving doors where approved by the authority having jurisdiction.

(c) Revolving doors shall not be used within 10 ft (3 m) of the foot of or 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 following:

Inside Diameter	Power Driven-type Speed Control (RPM)	Manual-type Speed Control (RPM)
6 ft 6 in. (198 cm)	11	12
7 ft 0 in. (213 cm)	10	12
7 ft 6 in. (229 cm)	9	11
8 ft 0 in. (244 cm)	9	10
8 ft 6 in. (259 cm)	8	9
9 ft 0 in. (274 cm)	8	9
9 ft 6 in. (290 cm)	7	8
10 ft 0 in. (305 cm)	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).

Exception No. 1 to (e): Revolving doors may be used without adjacent swinging doors for street floor elevator lobbies if 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 elevators and street.

Exception No. 2 to (e): Existing revolving doors where the number of revolving doors does not exceed the number of swing doors within 20 ft (6.1 m).

5-2.1.10.2 When permitted by Chapters 8 through 30, revolving doors may be used as a component in a means of egress under the following conditions:

(a) Revolving doors shall not be given credit for more than 50 percent of the required exit capacity.

(b) Each revolving door shall be credited with no more than ½ unit of exit width.

(c) Revolving doors shall be capable of being collapsed into a book-fold position when a force of not more than 130 lbf (578 N) is applied to wings within 3 in. (7.6 cm) of the outer edge.

5-2.1.10.3 Revolving doors not used as a component of a means of egress shall have a collapsing force of not more than 180 lbf (800 N).

Exception: Revolving doors may have a collapsing force set in excess of 180 lbf (800 N) if the collapsing force is reduced to not more than 130 lbf (578 N) when:

(a) There is a power failure or power is removed to the device holding the wings in position.

(b) There is an actuation of the automatic sprinkler system when such system is provided.

(c) There is actuation of a smoke detection system which is installed to provide coverage in all areas within the building which are within 75 ft (23 m) of the revolving doors.

(d) There is the actuation of a manual control switch which reduces the holding force to below the 130 lbf (578 N) level. Such switch shall be in an approved location and shall be clearly identified.

5-2.1.11 Turnstiles.

5-2.1.11.1* No turnstile or similar device to restrict travel to one direction or to collect fares or admission charges shall be so placed as to obstruct any required means of egress.

Exception No. 1: Approved turnstiles not over 39 in. (99 cm) high which turn freely in the direction of exit travel may be used in any occupancy where revolving doors are permitted by Chapters 8 through 30.

Exception No. 2: Where permitted by the authority having jurisdiction and Chapters 8 through 30, turnstiles may be used for exiting and each turnstile counted as ½ unit of exit width provided such turnstiles:

(a) Freewheel in the exit direction when primary power is lost, and freewheel in the direction of exit travel upon the manual release by an employee assigned in the area, and

(b) Shall not be given credit for more than 50 percent of the required units of exit width, and

(c) Shall not be over 39 in. (99 cm) high nor have a clear width less than 16½ in. (41.9 cm).

5-2.1.11.2 Turnstiles over 39 in. (99 cm) high shall be subject to the requirements for revolving doors.

5-2.1.11.3 Turnstiles in or furnishing access to required exits shall be of such design as to provide at least 16½ 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).

5-2.1.12 Doors in Folding Partitions. When permanently mounted folding or movable partitions are used to divide a room into smaller spaces, a swinging door or open doorway shall be provided as an exit access from each such space.

Exception: Under the following conditions the swinging door may be omitted and the partition may be used to enclose the space completely:

(a) The subdivided space shall not be used by more than 20 persons at any time.

(b) The use of the space shall be under adult supervision.

(c) The partitions shall be so arranged that they do not extend across any aisle or corridor used as an exit access to the required exits from the floor.

(d) The partitions shall conform to the interior finish and other applicable requirements of this Code.

(e) The partitions shall be an approved type, shall have a simple method of release, and shall be capable of being opened quickly and easily by inexperienced persons in case of emergency.

5-2.1.13 Balanced Doors. If balanced doors are used and panic hardware is required, the panic hardware shall be of the pushpad type and the pad shall not extend more than one-half the width of the door measured from the latch side.

5-2.2 Stairs.

5-2.2.1 General. A stairway, either interior or outside, may be used as a component in a means of egress when it conforms to the general requirements of Section 5-1 and to the special requirements of this subsection.

Exception No. 1: Aisle steps in assembly occupancies as provided in Chapters 8 and 9.

Exception No. 2: Existing noncomplying stairs may be continued in use subject to the approval of the authority having jurisdiction.

5-2.2.2 Classification.

5-2.2.2.1* Classification of Stairs. Stairs shall be in accordance with the following table:

New Stairs

Minimum width clear of all obstructions, except projections not exceeding 3½ in. (8.9 cm) at and below handrail height on each side	44 in. (112 cm) 36 in. (91 cm), where total occupant load of all floors served by stairways is less 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)
Winders	See 5-2.2.2.5.
Minimum headroom	6 ft 8 in. (203 cm)

New Stairs Cont.

Maximum height between landings	12 ft (3.7 m)
Minimum dimension of landings in direction of travel	See 5-2.2.4.3.
Doors opening immediately on stairs, without landing at least width of door	No

Exception: Existing stairs in existing buildings may remain in use or be rebuilt if they meet the requirements shown in the table for existing stairs.

Existing Stairs

	Class A	Class B
Minimum width clear of all obstructions, except projections not exceeding 3½ in. (8.9 cm) at and below handrail height on each side	44 in. (112 cm)	44 in. (112 cm)
	36 in. (91 cm), where total occupant load of all floors served by stairways is less than 50.	
Maximum height of risers	7½ in. (19.1 cm)	8 in. (20.3 cm)
Minimum tread depth	10 in. (24.4 cm)	9 in. (22.9 cm)
Winders	See 5-2.2.2.5.	See 5-2.2.2.5.
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)
Minimum dimension of landings in direction of travel	See 5-2.2.4.3.	See 5-2.2.4.3.
Doors opening immediately on stairs without landing at least width of door	No	No

5-2.2.2.2 Monumental Stairs. Monumental stairs, either inside or outside, may be used as a component in a means of egress if in compliance with all the requirements for stairs.

5-2.2.2.3 Curved Stairs. Curved stairs may be used as a component in a means of egress provided the minimum depth of tread is 10 in. (25.4 cm) and the smallest radius is not less than twice the stair width.

5-2.2.2.4 Spiral Stairs. Where permitted for individual occupancies by Chapters 8 through 30, spiral stairs may be used as a component in a means of egress provided:

(a) The clear width of the stairs is not less than 26 in. (66 cm).

(b) The height of riser shall not exceed 9½ in. (24.1 cm).

(c) Headroom shall be not less than 6 ft 6 in. (198 cm).

(d) Treads shall have a minimum depth of 7½ in. (19.1 cm) at a point 12 in. (30.5 cm) from the narrowest edge.

(e) All treads shall be identical.

(f) The occupant load served is not more than 5.

5-2.2.2.5 Winders. Where permitted for individual occupancies by Chapters 8 through 30, winders are allowed in stairs. Such winders shall have a minimum depth of tread of 6 in. (15.2 cm), and a minimum depth of tread of 9 in. (22.9 cm) at a point 12 in. (30.5 cm) from the narrowest edge.

5-2.2.3 Enclosures and Protection.

5-2.2.3.1 Enclosures. All interior stairs serving as an exit or exit component shall be enclosed in accordance with 5-1.3.1. All other interior stairs shall be protected in accordance with 6-2.2. In buildings four or more stories in height a sign shall be provided at each floor level landing. The sign shall indicate the floor level, the terminus of the top and bottom of the stair enclosure and the identification of the stair. (*Also see 6-2.2.9.*)

5-2.2.3.2* Separation and Protection of Outside Stairs. Outside stairs shall be separated from the interior of the building by walls with the fire resistance rating with fixed or self-closing opening protectives, as required for enclosed stairs. This protection shall extend at least 10 ft (3 m) upward or to the roofline, whichever is lower, at least 10 ft (3 m) horizontally and downward to ground level.

Exception No. 1: Outside stairways may be unprotected when serving an exterior exit access balcony which has two remote outside stairways or ramps.

Exception No. 2: Outside stairways may be unprotected when serving a two-story building where there is a remote second exit.

Exception No. 3: The fire resistance rating of the portion of the separation extending 10 ft (3 m) from the stairs need not exceed 1 hour.

5-2.2.3.3 All openings below an outside stair shall be protected:

(a) When located in a court the least dimension of which is less than one-third its height, or

(b) When located in an alcove having a width less than one-third its height and a depth greater than one-fourth its height.

5-2.2.3.4 There shall be no enclosed usable space within an exit enclosure, including under stairs, nor shall any open space within the enclosure, including stairs and landings, be used for any purpose such as storage or similar use which could interfere with egress. Where there is enclosed usable space under stairs, the walls and soffits of the enclosed space shall be protected the same as the stair enclosure. (*Also see 5-1.3.2.*)

5-2.2.3.5* Visual Protection. Outside stairs shall be so arranged as to avoid any handicap 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 at least 4 ft (122 cm) in height.

5-2.2.4 Stair Details.

5-2.2.4.1 All stairs serving as required means of egress shall be of permanent fixed construction.

5-2.2.4.2 Each new stair and platform, landing, etc., used in conjunction therewith in buildings more than three stories in height and in new buildings required by this *Code* to be of

fire-resistive construction, shall be of noncombustible material throughout.

Exception: Handrails are exempted from this requirement.

5-2.2.4.3 Stairways and intermediate landings shall continue with no decrease in width along the direction of exit travel. In new buildings every landing shall have a dimension, measured in direction of travel, equal to the width of the stair. Such dimension need not exceed 4 ft (122 cm) when the stair has a straight run.

5-2.2.4.4* Stair treads shall be uniformly slip resistant and shall be free of projections or lips that could trip stair users.

5-2.2.4.5 The minimum number of risers in any one flight of stairs shall be three.

5-2.2.4.6 Treads of stairs and landing floors shall be solid.

5-2.2.4.7 There shall be no variation exceeding 3/16 in. (.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. (1.0 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 of not more than 3 in. (7.6 cm) in every 3 ft (91 cm) of stairway width is permitted.*

5-2.2.4.8* 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.

Exception: Approved existing stairs.

5-2.2.4.9 Stairs and other exits shall be so arranged as to make clear the direction of egress to the street. Exit stairs that continue beyond the floor of discharge shall be interrupted at the floor of discharge by partitions, doors, or other effective means.

Exception: Exit stairs that continue one-half story beyond the level of exit discharge need not be interrupted by physical barriers where the exit discharge is clearly obvious.

5-2.2.4.10 Subject to the approval of the authority having jurisdiction, outside stairs may be accepted where leading to roofs of other sections of the building or adjoining building, where the construction is fire resistive, where there is a continuous and safe means of exit from the roof, and where all other reasonable requirements for life safety are maintained. (*Also see 5-7.5.*)

5-2.2.5 Special Provisions for Outside Stairs.

5-2.2.5.1 Balconies. Balconies to which access doors lead shall be approximately level with the floor of the building.

Exception: In existing buildings in climates where balconies may be subject to accumulation of snow or ice, one step, not to exceed 8 in. (20.3 cm), may be permitted below the level of the inside floor.

5-2.2.5.2 No structural metal member shall be employed the entire surface of which is not capable of being inspected and painted.

Exception: Where embedded in masonry or concrete or where a suitable fire-resistive and waterproof covering is provided.

5-2.2.5.3 All supporting members for balconies and stairs which are in tension and are fastened directly to the building shall pass through the wall and be securely fastened on the opposite side, or they shall be securely fastened to the framework of the building. Metal members shall be protected effectively against corrosion where they pass through walls.

5-2.2.5.4 Balcony and stair railings shall be designed to withstand both a vertical or horizontal force of 50 lb/linear ft (730 N/m) applied separately at the top of the railing. Where enclosures are used in place of railings, the horizontal load shall be considered to be applied at a height of 42 in. (107 cm) above the stair tread or balcony floor.

5-2.2.6 Guards and Handrails.

5-2.2.6.1* Means of egress such as landings, balconies, corridors, passageways, floor or roof openings, ramps, aisles, porches, or mezzanines 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. Stairs that are provided with handrails as specified in 5-2.2.6.4 need not be provided with guards. Each new stair and new ramp shall have handrails on both sides. In addition, handrails shall be provided within 44 in. (112 cm) of all portions of the required egress width of stairs. The required egress width shall be along the natural path of travel (*see also 5-2.2.6.4*). Existing stairs shall have a handrail on at least one side.

5-2.2.6.2 Required guards and handrails shall continue for the full length of each flight of stairs. At turns of stairs inside handrails shall be continuous between flights at landings.

Exception: On existing stairs the handrails are not required to be continuous between flights of stairs at landings.

5-2.2.6.3 The design of guards and handrails and the hardware for attaching handrails to guards, balusters, or masonry walls shall be such that there are no projecting lugs on attachment devices or nonprojecting corners or members of grilles or panels which may engage loose clothing. Openings in guards shall be designed to prevent loose clothing from becoming wedged in such openings.

5-2.2.6.4* Handrail Details.

(a) New handrails on stairs shall be not less than 30 in. (76.2 cm) nor more than 34 in. (86.36 cm) above the upper surface of the tread, measured vertically to the top of the rail from the tread at the leading edge.

Exception to (a): Additional handrails may be provided lower or higher than the main handrail.

(b)* New handrails shall provide a clearance of at least 1½ in. (3.8 cm) between handrail and wall to which fastened.

(c) Handrails shall be of such design and so supported as to withstand a load of not less than 200 lbf (890 N) applied at any point, vertically downward or horizontally.

(d)* New handrails shall be so designed as to be continuously graspable along the entire length.

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

(f)* New handrails that are not continuous between flights shall be extended horizontally a minimum of 12 in. (30.5 cm) at the required height at the top and bottom landings where a guard or wall exists.

(g) New handrails on open sides of stairs shall have intermediate rails or an ornamental pattern such that a sphere 6 in. (15.2 cm) in diameter cannot pass through any openings in such handrail.

Exception to (g): In detention and correctional occupancies as provided in Chapters 14 and 15, in industrial occupancies as provided in Chapter 28 and in storage occupancies as provided in Chapter 29.

5-2.2.6.5 Guard Details.

(a) The height of guards required by 5-2.2.6.1 shall be measured vertically to the top of the guard from the surface adjacent thereto.

(b) Guards shall be not less than 42 in. (107 cm) high.

Exception to (b): Guards within dwelling units may be 36 in. (91 cm) high.

(c) Open guards shall have intermediate rails or an ornamental pattern such that a sphere 6 in. (15.2 cm) in diameter cannot pass through any opening.

Exception No. 1 to (c): In detention and correctional occupancies as provided in Chapters 14 and 15, in industrial occupancies as provided in Chapter 28 and in storage occupancies as provided in Chapter 29.

Exception No. 2 to (c): Approved existing open guards.

(d) Enclosure walls and guards consisting of masonry, railings, or other construction either shall be designed for loads transmitted by attached handrails or shall be designed to resist a horizontal force of 50 lb/ft (730 N/m) applied at the top of the guard, whichever condition produces maximum stresses. For walls or guards higher than minimum height, the specified force shall be applied at a height of 42 in. (107 cm) above the floor or tread.

(e) Intermediate rails, balusters, and panel fillers shall be designed for a uniform horizontal load of not less than 25 lb/sq ft (1197 Pa) over the gross area of the guard (including the area of any openings in the guard) of which they are a part. Reactions due to this loading need not be added to the loading specified by 5-2.2.6.5(d) in designing the main supporting members of guards.

5-2.3 Smokeproof Enclosures.

5-2.3.1 When smokeproof enclosures are required by other sections of this *Code* they shall comply with 5-2.3.

Exception: Existing smokeproof enclosures subject to the approval of the authority having jurisdiction.

5-2.3.2* A smokeproof enclosure shall be a stair enclosure so designed that the movement into the smokeproof enclosure of products of combustion produced by a fire occurring in any part of the building shall be limited.

5-2.3.3 The appropriate design method shall be any system which meets the performance level stipulated in 5-2.3.2 above. The smokeproof enclosure may be accomplished by using natural ventilation, by using mechanical ventilation incorporating a vestibule or by pressurizing the stair enclosure.

5-2.3.4 Enclosure. A smokeproof enclosure shall consist of a continuous stair enclosed from the highest point to the lowest point by fire barriers having a 2-hour fire resistance rating. Where a vestibule is used it shall be within the 2-hour enclosure and is part of the smokeproof enclosure.

5-2.3.5 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 other openings and shall be separated from the remainder of the building by fire barriers having a 2-hour fire resistance rating.

5-2.3.6 Access to the stair shall be by way of a vestibule or by way of an exterior balcony.

Exception: Smokeproof enclosures consisting of a pressurized stair enclosure complying with 5-2.3.9.

5-2.3.7 Natural Ventilation. Smokeproof enclosures by natural ventilation shall comply with all the following:

(a) Where a vestibule is provided, the doorway into the vestibule shall be protected with an approved fire door assembly having a 1½-hour fire protection rating and the fire door assembly from the vestibule to the stair 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. Where access to the stair is by means of an open exterior balcony, the door assembly to the stair shall have a 1½-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 as required in 5-2.2.3.2.

(b) Every vestibule shall have a minimum net area of 16 sq ft (1.5 sq m) of opening in an exterior wall facing an exterior court, yard or public space at least 20 ft (6.1 m) in width.

(c) Every vestibule shall have a minimum dimension not less than the required width of the corridor leading to it and a minimum dimension of 72 in. (183 cm) in the direction of travel.

5-2.3.8 Mechanical Ventilation. Smokeproof enclosures by mechanical ventilation shall comply with all of the following:

(a) The door assembly from the building into the vestibule shall have a 1½-hour fire protection rating and the door assembly from the vestibule to the stairway shall have not less than a 20-minute fire protection rating. The door to the stairway shall be designed and installed to minimize air leakage. The doors shall be self-closing or shall be automatic-closing by actuation of a smoke detector located within 10 ft (3 m) of the vestibule door.

(b) Vestibules shall have a minimum dimension of 44 in. (112 cm) in width and 72 in. (183 cm) in direction of exit travel.

(c) 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 that purpose. 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) down from 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. Duct openings may be provided with controlling

dampers if needed to meet the design requirements but are not otherwise required.

(d) The vestibule ceiling shall be at least 20 in. (50.8 cm) higher than the door opening into the vestibule to serve as a smoke and heat trap and to provide an upward moving air column. The height may be decreased when justified by engineering design and field testing.

(e) The stair shall be provided with a dampered relief opening at the top and supplied mechanically with sufficient air to discharge a minimum of 2500 cu ft/min (70.8 cu m/min) through the relief opening column in the stair relative to atmosphere with all doors closed and a minimum of 0.10 in. water column (25 Pa) difference between the stair and the vestibule.

5-2.3.9 Stair Pressurization. Smokeproof enclosures by stair pressurization shall comply with all of the following:

(a) The building shall be protected throughout by an approved supervised automatic sprinkler system in accordance with Section 7-7.

(b) There shall be an engineered system to pressurize the stair enclosure capable of developing 0.05 in. of water column (12.5 Pa) in addition to the maximum anticipated stack pressure relative to other parts of the building measured with all the enclosure doors closed.

5-2.3.10 Activation of Mechanical Ventilation Systems.

5-2.3.10.1 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.

5-2.3.10.2 The required mechanical systems shall operate at the activation of the smoke detectors in 5-2.3.10.1 and by manual controls accessible to the fire department. The required system shall also be initiated by the following, if provided:

(a) Waterflow signal from a complete automatic sprinkler system.

(b) General evacuation alarm signal (*see 7-6.3.5*).

5-2.3.11 Door Closers. The activation of the closing device on any door shall activate the closing devices on all doors in the smokeproof enclosure at all levels.

5-2.3.12 Standby Power. Standby power for mechanical ventilation equipment shall be provided by an approved self-contained generator set to operate whenever there is a loss of power in the normal house current. The generator shall be in a separate room having a minimum 1-hour fire-resistive occupancy separation and shall have a minimum fuel supply adequate to operate the equipment for 2 hours.

5-2.3.13 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 these requirements.

5-2.3.14 Emergency Lighting. The stair shaft and vestibule shall be provided with emergency lighting. A standby generator which is installed for the smokeproof enclosure mechanical ventilation equipment may be used for such stair shaft and vestibule power supply.

5-2.4 Horizontal Exits.

5-2.4.1* Application. Horizontal exits may be substituted for other exits to an extent that the total exit capacity of the other exits (stairs, ramps, doors leading outside the building) will not be reduced below half that required for the entire area of the building or connected buildings if there were no horizontal exits.

Exception: In health care occupancies as provided in Chapters 12 and 13, and in detention and correctional occupancies as provided in Chapters 14 and 15.

5-2.4.2 Egress from Area of Refuge.

5-2.4.2.1 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 stairway or doorway leading outside or other exit which is not a horizontal exit. Any fire compartment not having a stairway or doorway leading outside shall be considered as part of an adjoining compartment with stairway.

Exception: In detention and correctional occupancies as provided in Chapters 14 and 15.

5-2.4.2.2* Every horizontal exit for which credit is given shall be so arranged that there are continuously available paths of travel leading from each side of the exit to stairways or other standard means of egress leading to outside the building.

5-2.4.2.3 Whenever either side of the horizontal exit is occupied, the doors used in connection with the horizontal exit shall be unlocked.

Exception: In health care occupancies as provided in Chapters 12 and 13, and in detention and correctional occupancies as provided in Chapters 14 and 15.

5-2.4.2.4 The floor area on either side of a horizontal exit shall be sufficient to hold the occupants of both floor areas, allowing not less than 3-sq ft (.28-sq m) clear floor area per person.

Exception: Special floor area requirements in health care occupancies as provided in Chapters 12 and 13, and in detention and correctional occupancies as provided in Chapters 14 and 15.

5-2.4.3 Walls for Horizontal Exits.

5-2.4.3.1 Fire barriers separating buildings or areas between which there are horizontal exits shall be an assembly of noncombustible or limited-combustible material having a 2-hour fire resistance rating. They shall provide a separation continuous to ground. (*See also 6-2.2.*)

Exception No. 1: Such fire barriers may be omitted on the street floor when they are supported on other construction having at least a 2-hour fire resistance rating continuous to the ground and meet all the conditions in the following Exception No. 2.

Exception No. 2: Where a fire barrier is used to provide a horizontal exit in any story of a building, such fire barrier may be omitted in any lower story under the following conditions:

(a) The open fire area story from which the fire barrier is omitted shall be separated from the stories above by fire barriers having at least a 2-hour fire resistance rating.

(b) Required exits from the stories above the open fire area story shall be separated therefrom by fire barriers having a

2-hour fire resistance rating and shall discharge outside without travel through the open fire area story.

(c) Vertical openings between the open fire area story and the stories above shall be enclosed with fire barriers having a 2-hour fire resistance rating. Other details shall be in accordance with the applicable provisions of 6-2.2.

Exception No. 3: Where a fire barrier is used to provide a horizontal exit for any story below the discharge level, such fire barriers may be omitted at the level of exit discharge under the following conditions:

(a) The open fire area story from which the fire barrier is omitted shall be separated from the stories below by fire barriers having at least a 2-hour fire resistance rating.

(b) Required exits from stories below the open fire area story shall be separated from the open fire area story by fire barriers having a 2-hour fire resistance rating and shall discharge directly outside without travel through the open fire area story.

(c) Vertical openings between the open fire area story and the floors below shall be enclosed with fire barriers having a 2-hour fire resistance rating. Other details shall be in accordance with the applicable provisions of 6-2.2.

5-2.4.3.2* Any opening in such fire barriers, whether or not such opening serves as an exit, shall be protected as provided in 6-2.2.5.

5-2.4.3.3 Swinging fire doors on horizontal exits shall swing with the exit travel. Where a horizontal exit serves areas on both sides of a fire barrier, there shall be adjacent openings with swinging doors at each, opening in opposite directions, with signs on each side of the fire barrier indicating as the exit the door which swings with the travel from that side, or other approved arrangements providing doors always swinging with any possible exit travel. Doors in horizontal exits shall be designed and installed to minimize air leakage.

Exception: Door swing in existing health care occupancies as provided in Chapter 13.

5-2.4.3.4* Doors in horizontal exits shall comply with the provisions of 5-2.1.4.

Exception: Sliding doors in detention and correctional occupancies as provided in Chapters 14 and 15, in industrial occupancies as provided in Chapter 28 and in storage occupancies as provided in Chapter 29.

5-2.4.4 Bridges and Balconies.

5-2.4.4.1 Each bridge or balcony utilized in conjunction with horizontal exits shall comply with the structural requirements for outside stairs and shall have guards and handrails in general conformity with the requirements of 5-2.2 for stairs and 5-2.3 for smokeproof enclosures.

5-2.4.4.2 Every bridge or balcony shall be at least as wide as the door leading to it and not less than 44 in. (112 cm) for new construction.

5-2.4.4.3 Every door leading to a bridge or balcony serving as a horizontal exit shall swing in the direction of exit travel.

Exception: In existing health care occupancies as provided in Chapter 13.

5-2.4.4.4 Where the bridge or balcony serves as a horizontal exit in one direction, only the door from the bridge or balcony into the area of refuge shall swing in.

5-2.4.4.5 Where the bridge or balcony serves as a horizontal exit in both directions, doors shall be provided in pairs swinging in opposite directions. Only the door swinging with the exit travel shall be counted in determination of exit width.

Exception No. 1: 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 sq ft (.28 sq m) per person.

Exception No. 2: In existing buildings doors on both ends of the bridge or balcony may swing out from the building subject to the approval of the authority having jurisdiction.

5-2.4.4.6 The bridge or balcony floor shall be approximately level with the building floor and in climates subject to the accumulation of snow and ice shall be protected to prevent the accumulation of snow and ice.

Exception: In existing buildings in climates where balconies may be subject to the accumulation of snow or ice, one step, not to exceed 8 in. (20.3 cm), may be permitted below the level of the inside floor.

5-2.4.4.7* Ramps shall be employed where there is a difference in level between connected buildings or floor areas. Steps may be used where the difference in elevation is greater than 21 in. (53.3 cm). Ramps and stairs shall be in accordance with the sections of this *Code* pertaining to ramps and stairs.

5-2.4.4.8 All wall openings, in both of the connected buildings or fire areas, 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.

Exception: Where bridges have solid sides not less than 6 ft (183 cm) in height such protection of wall openings may be omitted.

5-2.5 Ramps.

5-2.5.1 General. A ramp, either interior or outside, may be used as a component in a means of egress when it conforms to the general requirements of Section 5-1 and to the special requirements of this subsection.

5-2.5.2 Classification. A ramp shall be designated as Class A or Class B in accordance with the following table:

	Class A	Class B
Minimum width	44 in. (112 cm)	30 in. (76 cm)
Maximum slope	1 in 10	1 in 8
Maximum height between landings	No limit	12 ft (3.7 m)
Capacity in persons per unit of exit width (except as modified by Chapters 8 through 30)		
Down	100	100
Up	100	60

Exception: Existing Class B ramps with slopes of 1 3/16 to 2 in 12 are permitted subject to the approval of the authority having jurisdiction.

5-2.5.3 Enclosure and Protection.

5-2.5.3.1 When a ramp inside a building is used as an exit or exit component it shall be protected by separation from other parts of the building, as specified in 5-1.3.

5-2.5.3.2 Fixed fire window assemblies may be installed in such a separation in a fully sprinklered building.

5-2.5.3.3* Separation and Protection of Outside Ramps. Outside ramps shall be separated from the interior of the building by walls with the fire resistance rating with fixed or self-closing opening protectives, as required for enclosed stairs. This protection shall extend at least 10 ft (3 m) upward or to the roofline, whichever is lower, at least 10 ft (3 m) horizontally and downward to ground level.

Exception No. 1: Outside ramps may be unprotected when serving an exterior exit access balcony which has two remote outside stairways or ramps.

Exception No. 2: Outside ramps may be unprotected when serving a two-story building where there is a remote second exit.

Exception No. 3: The fire resistance rating of the portion of the separation extending 10 ft (3 m) from the ramp need not exceed 1 hour.

Exception No. 4: All openings below an outside ramp shall be protected:

(a) When in a court, the least dimension of which is less than one-third of its height, or

(b) When in an alcove having a width less than one-third of its height and a depth greater than one-fourth of its height.

5-2.5.3.4* There shall be no enclosed usable space under ramps within an exit enclosure nor shall the open space under such ramps be used for any purpose. Where there is enclosed usable space under ramps the walls and soffits of the enclosed space shall be protected the same as the ramp enclosure.

5-2.5.3.5* Visual Protection. Outside ramps shall be so arranged as to avoid any handicap 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.

5-2.5.4 Ramp Details.

5-2.5.4.1 All ramps serving as required means of egress shall be of permanent fixed construction.

5-2.5.4.2 A ramp used as a means of egress in a building more than three stories in height or in a building of any height of noncombustible or fire-resistive construction shall be of an assembly of noncombustible or limited-combustible material. The ramp floor and landings shall be solid and without perforations.

5-2.5.4.3 A ramp and the platforms and landings associated therewith shall be designed for not less than 100-lb/sq ft (488-kg/m^2) live load.

5-2.5.4.4 A ramp shall have a slip-resistant surface.

5-2.5.4.5 The slope of a ramp shall not vary between landings. Landings shall be level and changes in direction of travel, if any, shall be made only at landings.

5-2.5.4.6 Guards and handrails complying with 5-2.2.6 shall be provided in comparable situations for ramps.

5-2.5.5 Special Provision for Outside Ramps.

5-2.5.5.1 Balconies or landings to which doors lead shall be approximately level with the floor of the building.

Exception: In existing buildings in climates where balconies or landings may be subject to accumulation of snow or ice, one step, not to exceed 8 in. (20.3 cm), may be permitted below the level of the inside floor.

5-2.5.5.2 Structural metal members, where used, shall be capable of inspection over their entire length.

Exception: Where embedded in masonry or concrete, where a suitable fire-resistive and waterproof covering is provided, or where corrosion-resistive metals are used.

5-2.5.5.3 All supporting members for balconies and ramps that are in tension and are fastened directly to the building shall pass through the wall and be securely fastened on the opposite side or shall be securely fastened to the framework of the building. Metal members shall be protected effectively against corrosion where they pass through walls.

5-2.5.5.4 Balcony and ramp railings shall be designed to withstand both a vertical and horizontal force of 50 lb per linear ft (730 N/m) applied separately at the top of the railing. Where enclosures are used in place of railings, the horizontal load shall be considered to be applied at a height of 42 in. (107 cm) above the stair tread or balcony floor.

5-2.6* Exit Passageways.

5-2.6.1 General. Any hallway, corridor, passage, tunnel, underfloor passageway, or overhead passageway shall be permitted as an exit passageway and as an exit or exit component when conforming to all other requirements of Section 5-1 as modified by the provisions of this section.

5-2.6.2 Enclosure. An exit passageway shall be protected by separation from other parts of the building as specified in 5-1.3.1.

Exception: Fixed wired glass panels in steel sash may be installed in such a separation in a fully sprinklered building.

5-2.6.3 Width. The width of an exit passageway shall be adequate to accommodate the aggregate capacity of all exits discharging through it.

5-2.6.4 Floor. The floor shall be solid and without perforations.

5-2.7 Escalators and Moving Walks.

5-2.7.1 Escalators and moving walks shall not constitute a part of the required means of egress.

Exception: Previously approved escalators and moving walks in existing buildings.

5-2.8 Fire Escape Stairs.

5-2.8.1 General.

5-2.8.1.1* Fire escape stairs shall comply with the provisions of 5-2.8.

Exception: Existing noncomplying fire escape stairs may be continued in use subject to the approval of the authority having jurisdiction.

5-2.8.1.2 Fire escape stairs shall not constitute any of the required means of egress in new buildings.

5-2.8.1.3 New fire escape stairs for existing buildings may be erected only when it has been determined that outside stairs (*see 5-2.2*) are not practical. New fire escape stairs shall not incorporate ladders or access windows regardless of occupancy classification or load.

5-2.8.1.4 Fire escape stairs may be used in existing buildings as permitted in the applicable existing occupancy chapters but shall not constitute more than 50 percent of the required exit capacity.

5-2.8.1.5 Fire escape stairs shall provide a continuous unobstructed safe path of travel to the exit discharge or a safe area of refuge.

5-2.8.1.6 Fire escape stairs of the return platform type with superimposed runs or the straight run type with platform and continuing in the same direction may be used.

5-2.8.1.7 Either type may be parallel to or at right angles to buildings. Either type may be attached to buildings or erected independently of buildings and connected by walkways.

5-2.8.2 Protection of Openings.

5-2.8.2.1 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 window assemblies when the opening or any portion of the opening is located as follows:

(a) *Horizontally.* If within 15 ft (4.5 m) of any balcony, platform or stairway constituting a component of the fire escape stair.

(b) *Below.* If within three stories or 35 ft (10.7 m) of any balcony, platform, walkway or stairway constituting a component of the fire escape stair or within two stories or 20 ft (6.1 m) of a platform or walkway leading from any story to the fire escape stair.

(c) *Above.* If within 10 ft (3 m) of any balcony, platform or walkway as measured vertically or of any stair tread surface as measured vertically.

(d) *Top Story.* Protection for wall openings shall not be required where stairs do not lead to the roof.

(e) *Court.* Any wall facing a court served by a fire escape stair when the least dimension of the court is less than one-third of the height to the uppermost platform of the fire escape stair measured from the ground.

(f) *Alcove.* Any wall facing an alcove served by a fire escape stair when the width of the alcove is less than one-third or the depth greater than one-fourth of the height to the uppermost platform of the fire escape stair measured from the ground.

Exception: The provisions of 5-2.8.2 may be modified by the authority having jurisdiction in consideration of automatic sprinkler protection, low hazard occupancy, or other special conditions.

5-2.8.3 Access.

5-2.8.3.1 Access to fire escape stairs shall be in accordance with 5-2.8.4 and 5-5.1.2.

Exception: When permitted by the existing occupancy chapters of this Code, access to fire escape stairs may be by way of windows. No screening or storm windows may be used if they impair free access to the fire escape stair. Windows shall be arranged and so maintained as to be easily opened with a minimum of physical effort.

5-2.8.3.2 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. In other cases, if the roof has a pitch of 1 to 6 or less, fire escape ladders in accordance with 5-2.9 shall be provided for access to the roof.

5-2.8.3.3 Access to a fire escape stair shall be directly to a balcony, landing or platform. These shall be no higher than the floor or window sill level and no lower than 8 in. (20.3 cm) below the floor level or 18 in. (45.7 cm) below the window sill.

5-2.8.4 Stair Details. Fire escape stairs shall comply with the requirements of Table 5-2.8.4A and subsequent sections. Replacement of fire escape stairs shall comply with the requirements of Table 5-2.8.4B.

5-2.8.5 Guards, Handrails and Visual Enclosures.

5-2.8.5.1 All fire escape stairs shall have walls or guards and handrails on both sides in accordance with 5-2.2.6.

Exception: Existing handrails on existing fire escape stairs may continue to be used if the height does not exceed 42 in. (107 cm).

5-2.8.5.2 Replacement fire escape stairs in occupancies serving more than 10 occupants shall have visual enclosures to avoid any handicap 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 at least 42 in. (107 cm) in height.

5-2.8.6 Materials and Strength.

5-2.8.6.1 Noncombustible materials shall be used for the construction of all components of fire escape stairs. Any component that cannot be visually inspected shall be of corrosion-resistive material or shall be provided with a fire-resistive and waterproof covering.

5-2.8.6.2 Fastenings to the building wall shall be to the framework of the building or shall pass through the wall and be secured on the opposite side.

5-2.8.6.3 For a very small building (*see Table 5-2.8.4A*), the authority having jurisdiction may approve any existing fire escape stair without imposing the strength requirements of 5-2.2.6 when it has been shown by load test or other satisfactory evidence to have adequate strength.

Table 5–2.8.4 A

	Fire Escape Stairs Serving more than 10 occupants	**Fire Escape Stairs** 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 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, ½-in. (1.3-cm) dia. perforations permitted	Flat metal bars on edge or sq. bars secured against turning, spaced 1¼ in. (3.2 cm) max. 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
Handrail height	42 in. (107 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
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	45 per unit, if access by door; 20 if access by climbing over windowsill	10; if winders or ladder from bottom balcony, 5; if both, 1

Table 5-2.8.4 B

	Replacement Fire Escape Stairs Serving more than 10 occupants	**Replacement Fire Escape Stairs** Serving 10 or fewer occupants
Minimum widths	22 in. (55.9 cm) clear between rails	Same
Minimum horizontal dimension 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, ½-in. (1.3-cm) dia. perforations permitted	Same
Winders	None	Permitted subject to 5-2.2.2.5
Spiral	None	Permitted subject to 5-2.2.2.4
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
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	45 per unit, if access by door; 20 if access by climbing over windowsill	10 per unit

5-2.8.7* Swinging Stairs.

5-2.8.7.1 A single swinging stair section shall be permitted to terminate fire escape stairs over sidewalks, alleys or driveways, when it is impractical to make the termination with fire escape stairs.

5-2.8.7.2 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.

5-2.8.7.3 Width of swinging stair sections shall be no less than that of the fire escape stairs above.

5-2.8.7.4 Pitch of swinging stair sections shall be no steeper than that of the fire escape stairs above.

5-2.8.7.5 Guards and handrails in accordance with 5-2.2.6 shall be provided 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 when stairs swing downward. Minimum clearance between moving sections and any other portion of the stair system where hands might be caught shall be 4 in. (10.2 cm).

5-2.8.7.6 If the distance from the lowest platform to ground exceeds 12 ft (3.7 m), an intermediate balcony not more than 12 ft (3.7 m) from the ground or less than 7 ft (213 cm) in the clear underneath shall be provided with width not less than that of the stairs and length not less than 4 ft (122 cm).

5-2.8.7.7 Swinging stairs shall be counterbalanced about a pivot, and cables shall not be used. A weight of 150 lb (68 kg) one step from the pivot shall not start the swinging stairs downward, and a weight of 150 lb (68 kg) one-quarter of the length of the swinging stairs from the pivot will positively cause the stairs to swing down.

5-2.8.7.8 The pivot for swinging stairs shall be of a corrosion-resistant assembly or have clearances to prevent sticking due to corrosion.

5-2.8.7.9* No device to lock a swinging stair section in the up position shall be installed.

5-2.8.8 Intervening Spaces.

5-2.8.8.1 When approved by the authority having jurisdiction, fire escape stairs may lead to an adjoining roof that must be crossed before continuing downward travel. The direction of travel shall be clearly marked and walkways with guards and handrails complying with 5-2.2.6 shall be provided.

5-2.8.8.2 When approved by the authority having jurisdiction, fire escape stairs may be used in combination with interior or outside stairs complying with 5-2.2, providing a continuous safe path of travel is maintained.

5-2.9 Fire Escape Ladders.

5-2.9.1 General. Fire escape ladders shall not be used in a required means of egress.

Exception No. 1: Fixed fire escape ladders may be used:

(a) To provide access to unoccupied roof spaces as permitted by 5-2.8.3.2;

(b) To provide a means of escape from storage elevators as permitted by Chapter 29;

(c) To provide a means of egress from towers and elevated platforms around machinery or similar spaces subject to occupancy only by able-bodied adults, not more than 3 in number; or

(d) To provide a secondary means of escape from boiler rooms or similar spaces subject to occupancy only by able-bodied adults, not more than 3 in number.

Exception No. 2: When approved by the authority having jurisdiction, fire escape ladders may be used to provide access to the ground from the lowest balcony or landing of a fire escape stair for very small buildings as permitted by 5-2.8.4.

5-2.9.2 Construction and Installation. Fire escape ladders shall comply with the requirements of ANSI A14.3, *Safety Code for Fixed Ladders.*

Exception No. 1: Existing ladders complying with this code in effect when the ladders were installed may continue to be used subject to the approval of the authority having jurisdiction.

Exception No. 2: Ladders installed with pitch less than 75 degrees shall not be permitted.

Exception No. 3: Combustible ladders shall not be permitted.

5-2.10 Slide Escapes.

5-2.10.1 General.

5-2.10.1.1 A slide escape may be used as a component in a means of egress where specifically authorized by Chapters 8 through 30.

5-2.10.1.2 Each slide escape shall be of an approved type.

5-2.10.1.3 Slide escapes used as exits shall comply with the applicable requirements of Chapter 5 for other types of exits subject to the approval of the authority having jurisdiction.

5-2.10.2 Capacity.

5-2.10.2.1 Slide escapes, where permitted as required exits, shall be rated at one exit unit per slide, with rated travel capacity of 60 persons.

5-2.10.2.2 Slide escapes shall not constitute more than 25 percent of the required number of units of exit width from any building or structure or any individual story or floor thereof.

Exception: As permitted for high hazard manufacturing buildings or structures.

SECTION 5-3 CAPACITY OF MEANS OF EGRESS

5-3.1 Occupant Load.

5-3.1.1 The capacity of means of egress for any floor, balcony, tier, or other occupied space shall be sufficient for the occupant load thereof.

5-3.1.2* The occupant load permitted in any building or portion thereof shall not be assumed to be less than the number determined by dividing the floor area assigned to that use by the occupant load factor as specified in Chapters 8 through 30 for individual occupancies. Where both gross and net area figures are given for the same occupcancy, calculations shall be made applying the gross area figure to the building as a whole and the net area figure to the net area of the specific use.

5-3.1.3 The occupant load permitted in any building or portion thereof may be increased from that number established for the given use as specified in 5-3.1.2 when all other requirements of this *Code* are also met based on such modified number. The authority having jurisdiction may require an approved aisle, seating, or fixed equipment diagram to substantiate any increase in occupant load and may require that such diagram be posted in an approved location.

5-3.1.4 Where exits serve more than one floor, only the occupant load of each floor considered individually need be used in computing the capacity of the exits at that floor, provided that exit capacity shall not be decreased in the direction of exit travel.

5-3.1.5 When means of egress from floors above and below converge at an intermediate floor, the capacity of the means of egress from the point of convergence shall be not less than the sum of the two.

5-3.2* Units of Exit Width.

5-3.2.1 Means of egress shall be measured in units of exit width of 22 in. (55.9 cm). Fractions of a unit less than 12 in. (30.5 cm) shall not be counted. Fractions of a unit comprising 12 in. (30.5 cm) or more, added to one or more full units, shall be counted as ½ unit of exit width.

5-3.2.2* Width of means of egress shall be measured in the clear at the narrowest point of the exit component under consideration.

Exception: Projections not to exceed 3½ in. (8.9 cm) on each side are permitted at and below handrail height.

5-3.3 Capacity per Unit of Width. The capacity in number of persons per unit of width for approved components of means of egress shall not be greater than as follows:

(a) Level egress components, and Class A ramps — 100.

(b) Class B ramps — 75 for travel in the up direction, 100 for travel in the down direction.

(c) Stairways — 75.

5-3.4 Minimum Width.

5-3.4.1 The minimum width of any exit access shall be as specified for individual occupancies by Chapters 8 through 30, but in no case shall such width be less than 36 in. (91 cm).

Exception No. 1: Doors as provided for in 5-2.1.3.

Exception No. 2: In existing buildings the minimum width shall not be less than 28 in. (71 cm).

Exception No. 3: Aisles in assembly occupancies as provided in Chapters 8 and 9.

5-3.4.2 Where a single exit access leads to an exit, its capacity in terms of width shall be at least equal to 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 must accommodate.

SECTION 5-4 NUMBER OF EXITS

5-4.1 General.

5-4.1.1* Number of exits shall be as specified for the particular occupancy in Chapters 8 through 30.

SECTION 5-5 ARRANGEMENT OF MEANS OF EGRESS

5-5.1 General.

5-5.1.1 Exits shall be so located and exit access shall be so arranged that exits are readily accessible at all times.

5-5.1.2 Where exits are not immediately accessible from an open floor area, safe and continuous passageways, aisles, or corridors shall be maintained leading directly to every exit and shall be so arranged as to provide convenient access for each occupant to at least two exits by separate ways of travel.

Exception: Where a single exit or limited dead ends are permitted by other provisions of the Code.

5-5.1.3* When more than one exit is required from a building or portion thereof such exits shall be remote from each other and so arranged and constructed as to minimize any possibility that more than one may be blocked off by any one fire or other emergency condition.

5-5.1.4* Interlocking or scissor stairs may be considered separate exits if enclosed in accordance with 5-1.3.1 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.

5-5.1.5* Means of egress shall be so arranged that there are no dead-end pockets, hallways, corridors, passageways, or courts whose depth exceeds the limits specified for individual occupancies by Chapters 8 through 30.

5-5.1.6 Exit access shall be so arranged that it will not be necessary to pass through any area identified under Protection from Hazards in Chapters 8 through 30.

5-5.2 Impediments to Egress (*see also 5-1.7 and 5-2.1.5*).

5-5.2.1 In no case shall access to an exit be through kitchens, storerooms, restrooms, workrooms, closets, bedrooms or similar spaces or other rooms subject to locking.

Exception No. 1: Where the exit is required to serve only the bedroom or other room subject to locking, or adjoining rooms constituting part of the same dwelling or apartment used for single-family occupancy.

Exception No. 2: Exit access in detention and correctional occupancies may pass through rooms or spaces subject to locking as provided in Chapters 14 and 15.

Exception No. 3: Exit access in mercantile occupancies may pass through store rooms as provided in Chapters 24 and 25.

5-5.2.2* Exit access and the doors to exits to which they lead shall be so designed and arranged as to be clearly recognizable. Hangings or draperies shall not be placed over exit doors or otherwise located so as 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.

5-5.3 Exterior Ways of Exit Access.

5-5.3.1 Exit access may be by means of any exterior balcony, porch, gallery, or roof that conforms to the requirements of this chapter.

5-5.3.2 Exterior exit access balconies shall be separated from the interior of the building by walls and opening protectives as required for corridors.

Exception: When the exterior exit access balcony is served by at least two stairs and has no dead ends, or where dead ends occur, travel past an unprotected opening is not necessary to reach a stair.

5-5.3.3 A permanent, reasonably straight path of travel shall be maintained over the required exterior exit access.

5-5.3.4 There shall be no obstruction by railings, barriers, or gates that divide the open space into sections appurtenant to individual rooms, apartments, or other subdivisions.

5-5.3.5 An exterior exit access shall be so arranged that there are no dead ends in excess of 20 ft (6.1 m).

5-5.3.6 Any gallery, balcony, bridge, porch or other exterior exit access that projects beyond the outside wall of the building shall comply with the requirements of this chapter as to width and arrangement.

5-5.3.7 Exterior exit access shall have smooth, solid, substantially level floors, and shall have guards on the unenclosed sides at least equivalent to those specified in 5-2.2.6.

5-5.3.8 Where accumulation of snow or ice is likely because of the climate, the exterior exit access shall be protected by a roof.

5-5.3.9 The materials of construction shall be as permitted for the building served.

SECTION 5-6 MEASUREMENT OF TRAVEL DISTANCE TO EXITS

5-6.1* The maximum travel distance in any occupied space to at least one exit, measured in accordance with the following requirements, shall not exceed the limits specified for individual occupancies by Chapters 8 through 30.

5-6.2* The travel distance to an exit shall be measured on the floor or other walking surface along the center line of the natural path of travel starting 1 ft (30.5 cm) from the most remote point, curving around any corners or obstructions with a 1-ft (30.5-cm) 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 may terminate at a smoke barrier in existing detention and correctional occupancies as provided in Chapter 15.

5-6.3 In the case of open areas, distance to exits shall be measured from the most remote point subject to occupancy.

5-6.4 In the case of individual rooms subject to occupancy by not more than 6 persons, distance to exits shall be measured from the doors of such rooms provided the path of travel from any point in the room to the room door does not exceed 50 ft (15 m).

5-6.5 Where open stairways or ramps are permitted as a path of travel to required exits, such as between mezzanines or balconies and the floor below, the distance shall include the travel on the stairway or ramp and the travel from the end of the stairway or ramp to reach an outside door or other exit in addition to the distance to reach the stairway or ramp.

5-6.6 Where any part of an exterior exit access is within 15 ft (4.5 m) horizontal distance of any unprotected building opening, as permitted by 5-2.2.3.2 for outside stairs, the distance to the exit shall include the length of travel to ground level.

SECTION 5-7 DISCHARGE FROM EXITS

5-7.1* All exits shall terminate directly at a public way or at an 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: As permitted by 5-7.2 and 5-7.5.

Exception No. 2: Means of egress may terminate in an exterior area of refuge in detention and correctional occupancies as provided in Chapters 14 and 15.

5-7.2 Where permitted for individual occupancies by Chapters 8 through 30, a maximum of 50 percent of the exits may discharge through areas on the level of discharge provided all of the following are met:

(a) Such exits discharge to a free and unobstructed way to the exterior of the building, which way is readily visible and identifiable from the point of discharge from the exit.

(b) The entire area on the level of discharge is separated from areas below by construction having a minimum of 2-hour fire resistance rating.

(c) The level of discharge is protected throughout by an approved automatic sprinkler system and any other portion of the level of discharge with access to the discharge area is protected throughout by an approved automatic sprinkler system or separated from it in accordance with the requirements for the enclosure of exits (*see 5-1.3.1*).

Exception to (c): The requirements of 5-7.2(c) may be waived if the discharge area is a vestibule or foyer meeting all of the following:

1. The depth from the exterior of the building is not greater than 10 ft (3 m) and the length is not greater than 20 ft (6.1 m).

2. The foyer is separated from the remainder of the level of discharge by construction providing protection at least the equivalent of wired glass in steel frames.

3. The foyer serves only for means of egress including exits directly to the outside.

Exception: One hundred percent of the exits may discharge through areas on the level of exit discharge in detention and correctional occupancies as provided in Chapters 14 and 15.

5-7.3 The exit discharge shall be so arranged and marked as to make clear the direction of egress to a public way. Exit stairs that continue beyond the level of discharge shall be interrupted at the level of discharge by partitions, doors, or other physical barriers.

Exception: Exit stairs that continue one-half story beyond the level of exit discharge need not be interrupted by physical barriers where the exit discharge is clearly obvious.

5-7.4 Stairs, ramps, bridges, balconies, escalators, moving walks, and other components of an exit discharge shall comply with the detailed requirements of this chapter for such components.

5-7.5 Subject to the approval of the authority having jurisdiction, exits may be accepted where:

(a) They discharge to the roof or other sections of the building or adjoining buildings, and

(b) The roof has a fire resistance rating at least the equivalent of that required for the exit enclosure, and

(c) There is a continuous and safe means of egress from the roof, and

(d) All other reasonable requirements for life safety are maintained.

SECTION 5-8 ILLUMINATION OF MEANS OF EGRESS

5-8.1 General.

5-8.1.1* Illumination of means of egress shall be provided in accordance with this section for every building and structure when required in Chapters 8 through 30. For the purposes of this requirement, exit access shall include only designated stairs, aisles, corridors, ramps, escalators, and passageways leading to an exit.

5-8.1.2 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 places and for such periods of time as required to maintain the illumination to the minimum footcandle [Lux (lx)] values herein specified.

5-8.1.3* The floors of means of egress shall be illuminated at all points including angles and intersections of corridors and passageways, stairways, landings of stairs, and exit doors to values of not less than 1 footcandle (10 lx) measured at the floor.

Exception: In auditoriums, theaters, concert or opera halls, and other places of assembly, the illumination of the floors of exit access may be reduced during such periods of the performances to values not less than ⅛ footcandle (2 lx).

5-8.1.4 Any required illumination shall be so arranged that the failure of any single lighting unit, such as the burning out of an electric bulb, will not leave any area in darkness.

5-8.1.5 The same equipment or units installed to meet the requirements of Section 5-10 may also serve the function of illumination of means of egress, provided that all applicable requirements of this section for such illumination are also met.

5-8.2 Sources of Illumination.

5-8.2.1 Illumination of means of egress shall be from a source of reasonably assured reliability, such as public utility electric service.

5-8.2.2 No battery-operated electric light nor any type of portable lamp or lantern shall be used for primary illumination of means of egress but may be used as an emergency source to the extent permitted under Emergency Lighting, Section 5-9.

SECTION 5-9 EMERGENCY LIGHTING

5-9.1 General.

5-9.1.1 Emergency lighting facilities for means of egress shall be provided for every building or structure in accordance with this section when required in Chapters 8 through 30.

5-9.1.2 Where maintenance of illumination depends upon changing from one energy source to another, there shall be no appreciable interruption of illumination during the changeover. Where emergency lighting is provided by a prime mover-operated electric generator, a delay of not more than 10 seconds shall be permitted.

5-9.2 Performance of System.

5-9.2.1 Emergency lighting facilities shall be arranged to maintain the specified degree of illumination throughout the means of egress, but not less than 1 footcandle (10 lx), for a period of 1½ hours in the event of failure of the normal lighting. The illumination may decline to 0.6 footcandle (6 lx) at the end of the emergency lighting time duration. (*See also 5-8.1.3.*)

5-9.2.2* 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®*.

5-9.2.3* An emergency lighting system shall be so arranged as to provide the required illumination automatically in the event of any interruption of normal lighting, such as any failure of public utility or other outside electrical power supply, opening of a circuit breaker or fuse, or any manual act(s), including accidental opening of a switch controlling normal lighting facilities.

5-9.2.4 An emergency lighting system shall be either continuously in operation or capable of repeated automatic operation without manual intervention.

5-9.3 Testing and Maintenance. (*See Section 31-1.*)

SECTION 5-10 EXIT MARKING

5-10.1 General.

5-10.1.1* Where required by the provisions of Chapters 8 through 30, exits shall be marked by an approved sign readily visible from any direction of exit access.

5-10.1.2 Access to exits shall be marked by readily visible signs in all cases where the exit or way to reach it is not immediately visible to the occupants. Sign placement shall be such that no point in the exit access is more than 100 ft (30 m) from the nearest visible sign.

Exception: Signs in existing buildings need not meet the 100 ft (30 m) distance requirement.

5-10.1.3 When low level exit signs are specifically required by Chapters 8 through 30, an approved luminescent, self-luminous or self-illuminated sign shall be placed near the floor level below signs required for doors or in corridors by 5-10.1.1 and 5-10.1.2. This sign shall have appropriate wording in

plainly legible letters not less than 4½ in. (11.4 cm) nor more than 6 in. (15.2 cm) high with the principal strokes of letters not less than ¾ in. (1.9 cm) wide. The bottom of the sign shall be not less than 6 in. (15.2 cm) nor more than 8 in. (20.3 cm) above the floor. For exit doors, the sign shall be on the door or adjacent to the door with the closest edge of the sign within 4 in. (10.2 cm) of the door frame.

5-10.1.4* Every required sign designating an exit or way of exit access shall be so located and of such size, distinctive color, and design as to be readily visible and shall provide contrast with decorations, interior finish, or other signs. No decorations, furnishings, or equipment which impair visibility of an exit sign shall be permitted, nor shall there be any brightly illuminated sign (for other than exit purposes), display, or object in or near the line of vision to the required exit sign of such a character as to so detract attention from the exit sign.

5-10.2 Size of Signs. Every EXIT and directional EXIT sign required by Section 5-10 shall have the appropriate wording in plainly legible letters not less than 6 in. (15.2 cm) high with the principal strokes of letters not less than ¾ in. (1.9 cm) wide. The word "EXIT" shall have letters having a width not less than 2 in. (5 cm) except the letter "I" and the minimum spacing between letters shall be not less than ⅜ 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: Existing approved signs.

Exception No. 2: Existing signs having the required wording in plainly legible letters not less than 4 in. (10.2 cm) high may be continued in use.

Exception No. 3: Signs required by 5-10.1.3.

5-10.3 Illumination of Signs.

5-10.3.1* Every exit sign shall be suitably illuminated by a reliable light source. Externally and internally illuminated signs shall be visible in both the normal and emergency lighting mode.

5-10.3.2* Externally illuminated signs shall be illuminated by not less than 5 footcandles (54 lx) and shall employ a contrast ratio of not less than 0.5.

5-10.3.3* The visibility of an internally illuminated sign shall be the equivalent of an externally illuminated sign which complies with 5-10.3.2. The 0.5 contrast ratio shall be derived from luminance measurements obtained in units of footlamberts.

Exception No. 1: Approved existing signs.

Exception No. 2: Approved self-luminous or electroluminescent signs which operate in the 5,000 to 6,000 angstrom range which provide evenly illuminated letters may have a minimum luminance of 0.06 footlamberts (0.21 cd/sq m).*

5-10.3.4 Signs required by 5-10.1.3 shall provide evenly illuminated letters having a minimum luminance of 0.06 footlamberts (0.21 cd/sq m).

Exception: Signs complying with the requirements of 5-10.3.3 are acceptable.

5-10.3.5 Illumination of exit signs shall be continuous as required under the provisions of Section 5-8.

Exception: Illumination for exit signs may flash on and off upon activation of the fire alarm system.*

5-10.3.6 Where emergency lighting facilities are required by the applicable provisions of Chapters 8 through 30 for individual occupancies, the exit signs, except approved self-luminous signs, shall be illuminated by the emergency lighting facilities. The level of illumination of the exit sign shall be at the levels provided in accordance with 5-10.3.2 or 5-10.3.3 for the required emergency lighting time duration as specified in 5-9.2.1 but may decline to 60 percent of the illumination level at the end of the emergency lighting time duration.

5-10.4 Specific Requirements.

5-10.4.1 Directional Signs.

5-10.4.1.1 A sign reading EXIT or similar designation with an arrow indicating the direction shall be placed in every location where the direction of travel to reach the nearest exit is not immediately apparent.

5-10.4.1.2 Escalators, Moving Walks. A sign complying with 5-10.2 indicating the direction of the nearest approved exit shall be placed at the point of entrance to any escalator or moving walk that is not in a means of egress.

5-10.4.2 Special Signs.

5-10.4.2.1* Any door, passage, or stairway that is neither an exit nor a way of exit access and that is so located or arranged that it is likely to be mistaken for an exit shall be identified by a sign reading NO EXIT. Such sign shall have "NO" letters 2 in. (5 cm) high with stroke width of ⅜ in. (1 cm) and "EXIT" letters 1 in. (2.5 cm) high, with the word "EXIT" below "NO".

Exception: Approved existing signs.

5-10.4.2.2 A door designed to be kept normally closed shall bear a sign, visible only in the direction of exit travel, reading substantially as follows:

FIRE EXIT
Keep Door Closed

SECTION 5-11 SPECIAL PROVISIONS FOR OCCUPANCIES WITH HIGH HAZARD CONTENTS (*See Section 4-2.*)

5-11.1* In all cases where the contents are classified as high hazard, exits shall be provided of such types and numbers and so arranged as 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 over 75 ft (23 m), measured as specified in 5-6.2.

5-11.2 Capacity of means of egress provided in accordance with 5-11.1 shall be as specified in the applicable section of Chapters 8 through 30 but not less than such as to provide one unit for each 30 persons where exit is by inside or outside stairs or one unit for each 50 persons where exit is by doors at grade level, by horizontal exits, or by Class A ramps.

5-11.3 At least two exits shall be provided from each building or hazardous area thereof.

Exception: Rooms or spaces having an occupant load of not greater than three persons and having a maximum travel distance to the room door of 25 ft (7.6 m).

5-11.4 Means of egress shall be so arranged that there are no dead-end pockets, hallways, corridors, passageways, or courts.

CHAPTER 6 FEATURES OF FIRE PROTECTION

SECTION 6-1 GENERAL

6-1.1 Application.

6-1.1.1 The features of fire protection set forth in this chapter apply to both new and existing construction.

SECTION 6-2 CONSTRUCTION AND COMPARTMENTATION

6-2.1* Construction. Buildings or structures occupied or used according to the individual occupancy chapters (Chapters 8 through 30) 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.

6-2.2 Compartmentation.

6-2.2.1 When required by Chapters 8 through 30, every building shall be divided into compartments to limit the spread of fire and restrict the movement of smoke.

6-2.2.2* Fire compartments shall be formed with fire barriers which are continuous from outside wall to outside wall, from another fire barrier to a fire barrier, or a combination thereof; including continuity through all concealed spaces such as those found above a ceiling, including interstitial spaces.

Exception: A fire barrier required for an occupied space below an interstitial space is not required to extend through the interstitial space provided the construction assembly forming the bottom of the interstitial space has a fire resistance rating equal to that of the fire barrier.

6-2.2.3 Floor Openings.

6-2.2.3.1 Every floor that separates stories in a building shall be constructed as a smoke barrier to provide a basic degree of compartmentation (*see Section 3-2 for definition of smoke barrier*).

Exception No. 1: As permitted by 6-2.2.3.4.

Exception No. 2: As permitted by 6-2.2.3.5.

Exception No. 3: As permitted by Chapters 8 through 30.

6-2.2.3.2* Openings through floors, such as stairways, elevator hoistways, and shaftways used for light, ventilation or building services, shall be enclosed with fire barriers (vertical) such as wall or partition assemblies. Such enclosures shall be continuous from floor to floor. Openings shall be protected as appropriate for the fire resistance rating of the barrier.

Exception No. 1: As permitted by 6-2.2.3.4.

Exception No. 2: As permitted by 6-2.2.3.5.

Exception No. 3: As permitted by Chapters 8 through 30.

6-2.2.3.3* The minimum fire resistance rating for the enclosure of floor openings shall be as follows: (*See 5-1.3.1 for enclosure of exits.*)

(a) Enclosures connecting four stories or more in new construction — 2-hour fire barriers.

(b) Other enclosures in new construction — 1-hour fire barriers.

(c) Enclosures in existing buildings — ½-hour fire barriers.

(d) As specified in Chapter 18 for new apartment buildings and in Chapter 20 for lodging and rooming houses.

6-2.2.3.4 Where permitted by Chapters 8 through 30, unenclosed openings comprising a portion of the total area of the building are permitted for the purpose of communicating between three floor levels, providing the following conditions are met:

(a) The communicating area has a low hazard occupancy, or ordinary hazard occupancy protected throughout by an approved automatic sprinkler system.

(b) The lowest or next to the lowest level of the portion so designated is a street floor.

(c) The entire portion so designated is open and unobstructed in a manner such that it may be assumed that a fire in any part of the space will be readily obvious to the occupants.

(d) Exit capacity is sufficient to provide simultaneously for all the occupants of all levels to egress the portion so designated by considering it to be a single floor area for the determination of required exit capacity.

(e) Each floor level, considered separately, has at least one-half of its individual required exit capacity provided by an exit or exits leading directly out of that level without occupants having to traverse another communicating floor level or be exposed to the smoke or fire spreading from another communicating floor level.

6-2.2.3.5* Where permitted by Chapters 8 through 30, an atrium may be utilized providing the following conditions are met:

(a)* No horizontal dimension between opposite edges of the floor opening is less than 20 ft (6.1 m) and the opening is a minimum of 1,000 sq ft (93 sq m).

(b) The exits are separately enclosed from the atrium in accordance with 6-2.2.3.3. Access to exits may be within the atrium.

(c) The occupancy within the space meets the specifications for classification as low or ordinary hazard contents (*see 4-2.2*).

(d) The atrium is open and unobstructed in a manner such that it may be assumed that a fire in any part of the space will be readily obvious to the occupants prior to the time it becomes a hazard to them.

(e) The entire building is protected throughout by an approved supervised automatic sprinkler system in accordance with Section 7-7.

Exception to (e): When the ceiling of the atrium is more than 55 ft (17 m) above the floor the authority having jurisdiction may permit the omission of sprinklers at the top of the atrium.

(f) In new construction, an engineered smoke control system acceptable to the authority having jurisdiction shall be provided. Factors such as means of egress and smoke control of adjacent spaces shall be considered.

Exception to (f): In lieu of an engineered smoke control system, a smoke removal system acceptable to the authority having jurisdiction may be considered.*

(g)* In new construction the required engineered smoke control system or smoke removal system shall be activated by all of the following:

1. Approved smoke detectors located at the top of the atrium, and adjacent to each return air intake from the atrium, and

2. The required automatic sprinkler system, and

3. The required fire alarm system, and

4. Manual controls which are readily accessible to the fire department.

(h) *Enclosure of Atriums.* In new construction atriums shall be separated from the adjacent spaces by fire barriers with at least a 1-hour fire resistance rating with opening protectives as for corridor walls [*see 6-2.2.5(b) Exception No. 2*].

Exception No. 1 to (h): Any three levels of the building may open directly to the atrium without enclosure.

Exception No. 2 to (h): Glass walls may be used in lieu of the fire barriers where automatic sprinklers are spaced 6 ft (183 cm) apart or less along both sides of the glass wall, not more than 1 ft (30.5 cm) from the glass, and with the automatic sprinklers located so that the 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 which permits the glass framing system to deflect without breaking (loading) the glass before the sprinklers operate. Automatic sprinklers are not required on the atrium side of the glass wall when there is no walkway or other floor area on the atrium side above the main floor level. Doors in such walls may be glass or other material which will resist the passage of smoke. Doors shall be self-closing or automatic-closing upon detection of smoke.

6-2.2.3.6 Any escalators or moving walks serving as a required exit in existing buildings shall be enclosed in the same manner as exit stairways (*also see 5-2.7*).

6-2.2.3.7 Escalators or moving walks not constituting an exit shall have their floor openings enclosed or protected as required for other vertical openings.

Exception No. 1: In lieu of such protection, in buildings protected throughout by an approved automatic sprinkler system in accordance with Section 7-7, escalator or moving walk openings may be protected in accordance with the method detailed with NFPA 13, Standard for the Installation of Sprinkler Systems, or in accordance with a method as approved by the authority having jurisdiction.

Exception No. 2: Escalators in large open areas such as atriums and enclosed shopping malls

6-2.2.4 Fire barriers used to provide enclosure of floor openings or used for subdivision of stories shall be classified in accordance with their fire resistance rating as follows:

(a) 2-hour fire resistance rating.

(b) 1-hour fire resistance rating.

(c) ¾-hour fire resistance rating.

(d) ½-hour fire resistance rating.

(e) 20-minute fire resistance rating.

6-2.2.5* 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:

(a) 2-hour fire barrier — 1½-hour fire protection rating.

(b) 1-hour fire barrier — 1-hour fire protection rating when used for vertical openings or ¾-hour fire protection rating when used for other than vertical openings.

Exception No. 1 to (b): When a lesser fire protection rating is specified by Chapter 5 or Chapters 8 through 30.

Exception No. 2 to (b): Where the fire barrier is provided as a result of a requirement that corridor walls be of 1-hour fire resistance rated construction, the opening protectives shall have a fire protection rating of not less than 20 minutes when tested in accordance with NFPA 252, Standard Methods of Fire Tests of Door Assemblies, without the hose stream test.

Exception No. 3 to (b): 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 12 and 13.

(c) ¾-hour fire barrier — 20-minute fire protection rating.

(d) ½-hour fire barrier — 20-minute fire protection rating.

(e) 20-minute fire barrier — 20-minute fire protection rating.

6-2.2.6 Fire door assemblies in fire barriers shall comply with the provisions of 5-2.1.

6-2.2.7* Openings in fire barriers for air-handling ductwork or air movement shall be protected in accordance with 7-2.1.

6-2.2.8 Passages of pipes, conduits, bus ducts, cables, wires, air ducts, pneumatic ducts, and similar building service equipment through fire barriers shall be protected as follows:

(a) The space between the penetrating item and the fire barrier shall:

1. Be filled with a material capable of maintaining the fire resistance of the fire barrier, or

2. Be protected by an approved device designed for the specific purpose.

(b) 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:

1. Be filled with a material capable of maintaining the fire resistance of the fire barrier, or

2. Be protected by an approved device designed for the specific purpose.

(c)* Insulation and coverings for pipes and ducts shall not pass through the fire barrier unless:

1. The material is capable of maintaining the fire resistance of the fire barrier, or

2. Protected by an approved device designed for the specific purpose.

(d) Where designs take transmission of vibration into consideration, any vibration isolation shall:

1. Be made on either side of the fire barrier, or

2. Be by an approved device designed for the specific purpose.

6-2.2.9 The enclosing walls (fire barriers) of floor openings serving stairways or ramps that are required exits shall be so arranged as to provide a continuous path of escape, including landings and passageways, in accordance with 5-2.2, providing protection for persons using the stairway or ramp against fire, or smoke therefrom, in other parts of the building.

6-2.2.10 Floor-ceiling assemblies; and bearing and nonbearing wall or partition assemblies, used as fire barriers to form fire compartments; and columns, beams, girders, or trusses supporting such assemblies shall be of a design which has been tested to meet the conditions of acceptance of NFPA 251, *Standard Methods of Fire Tests of Building Construction and Materials.*

6-2.2.11 Door or window assemblies in fire barriers shall be of an approved type with appropriate rating for the location in which installed. Fire doors and windows shall be installed in accordance with NFPA 80, *Standard for Fire Doors and 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.* Fire windows shall be of a design which has been tested to meet the conditions of acceptance of NFPA 257, *Standard for Fire Tests of Window Assemblies.*

6-2.3 Concealed Spaces.

6-2.3.1* 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 6-5*) are exposed, shall be effectively firestopped or draftstopped with approved materials, as provided below:

(a) Every exterior and interior wall and partition shall be firestopped at each floor level, at the top-story ceiling level, and at the level of support for roofs.

(b) Every unoccupied attic space shall be subdivided by draftstops into areas not to exceed 3,000 sq ft (280 sq m).

(c) 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 1,000 sq ft (93 sq m) for any space between the ceiling and floor and 3,000 sq ft (280 sq m) for any space between the ceiling and roof.

Exception No. 1: If the space is protected throughout by an approved automatic sprinkler system in accordance with Section 7-7.

Exception No. 2: Concealed spaces serving as plenums. See NFPA 90A, Standard for the Installation of Air Conditioning and Ventilating Systems.

6-2.3.2 In every existing building, firestopping and draftstopping shall be provided as required by the provisions of Chapters 8 through 30.

SECTION 6-3 SMOKE BARRIERS

6-3.1* Where required by Chapters 8 through 30, smoke barriers shall be provided to subdivide building spaces for the purpose of restricting the movement of smoke.

6-3.2* Smoke barriers required by this *Code* shall be continuous from outside wall to outside wall, from a fire barrier to a fire barrier, from a floor to a floor, from a smoke barrier to a smoke barrier, or a combination thereof; including continuity 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 is not required to extend through the interstitial space, provided 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.

6-3.3 Doors.

6-3.3.1* Doors in smoke barriers shall be of a swinging type that close the opening with only a minimum clearance necessary for proper operation and shall be without undercuts, louvers, or grilles.

6-3.3.2* When a fire resistance rating is specified elsewhere in the Code for smoke barriers, the doors in the smoke barriers shall have a fire protection rating of at least 20 minutes. Vision panels in such doors shall be approved transparent wired glass.

Exception No. 1: If a different fire protection rating for smoke barrier doors is specified by Chapters 8 through 30.

Exception No. 2: Latching hardware is not required on doors in smoke barriers when so indicated by Chapters 8 through 30.

6-3.3.3* Doors in smoke barriers shall be self-closing or automatic-closing and shall comply with the provisions of 5-2.1.

6-3.4 Smoke Dampers.

6-3.4.1 An approved damper designed to resist the passage of smoke shall be provided at each air-transfer opening or duct penetration of a required smoke barrier.

Exception No. 1: Smoke dampers may be omitted in ducts or air-transfer openings which are part of an engineered smoke control system in accordance with Section 7-3.

Exception No. 2: Smoke dampers may be omitted in 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: Smoke dampers may be omitted where the air inlet or outlet openings in ducts are limited to a single smoke compartment.

Exception No. 4: Smoke dampers may be omitted where ducts penetrate floors which serve as smoke barriers.

Exception No. 5: Smoke dampers may be omitted when specifically permitted by Chapters 8 through 30.

6-3.4.2 Required smoke dampers in ducts penetrating smoke barriers shall close upon detection of smoke by:

(a) Approved smoke detectors installed in accordance with Chapter 9 of NFPA 72E, *Standard on Automatic Smoke Detectors*, or

(b) Approved local smoke detectors on either side of the smoke barrier door opening when ducts penetrate smoke barriers above the smoke barrier doors, or

(c) Approved smoke detectors located within the ducts in existing installations.

6-3.4.3 Required smoke dampers in air transfer openings shall close upon detection of smoke by approved smoke detectors installed in accordance with Chapter 9 of NFPA 72E, *Standard on Automatic Smoke Detectors.*

Exception: When a duct is provided on one side of the smoke

barrier, the smoke detectors on the duct side shall be in accordance with 6-3.4.2.

6-3.5 Penetrations and Miscellaneous Openings in Floors and Smoke Barriers.

6-3.5.1 Passages of pipes, conduits, bus ducts, cables, wires, air ducts, pneumatic ducts, and similar building service equipment through floors and smoke barriers shall be protected as follows:

(a) The space between the penetrating item and the smoke barrier shall:

1. Be filled with a material capable of maintaining the smoke resistance of the smoke barrier, or

2. Be protected by an approved device designed for the specific purpose.

(b) 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:

1. Be filled with a material capable of maintaining the smoke resistance of the smoke barrier, or

2. Be protected by an approved device designed for the specific purpose.

(c) Where designs take transmission of vibration into consideration, any vibration isolation shall:

1. Be made on either side of the smoke barrier, or

2. Be by an approved device designed for the specific purpose.

6-3.5.2 Openings occurring at points where floors or smoke barriers meet the outside walls, other smoke barriers, or fire barriers of a building shall:

(a) Be filled with a material capable of maintaining the smoke resistance of the floor or smoke barrier, or

(b) Be protected by an approved device designed for the specific purpose.

SECTION 6-4 SPECIAL HAZARD PROTECTION

6-4.1* Protection shall be provided from any area having a degree of hazard greater than that normal to the general occupancy of the building or structure, such as storage of combustibles or flammables, heat-producing appliances, or maintenance purposes, as follows:

(a) Enclosure with construction in accordance with Section 6-2 with a fire resistance rating as specified by Chapters 8 through 30, but not less than 1 hour without windows and with doors of ¾-hour fire protection rating, or

(b) Protection with automatic extinguishing systems in accordance with Section 7-7 as required by Chapters 8 through 30, or

(c) Both (a) and (b) above when specified by Chapters 8 through 30.

Exception: In existing buildings or structures, as permitted by Chapters 8 through 30, an automatic fire or smoke detection system in accordance with Section 7-6 may be substituted for the automatic extinguishing system if the enclosure above is achieved.

6-4.2* Where hazardous processes or storage are of such a character as to introduce an explosion potential, explosion venting or an explosion suppression system specifically designed for the hazard involved shall be provided.

6-4.3 Flammable liquids shall be protected in accordance with NFPA 30, *Flammable and Combustible Liquids Code.*

SECTION 6-5 INTERIOR FINISH

6-5.1 General.

6-5.1.1* Interior finish means the exposed interior surfaces of buildings including, but not limited to, fixed or movable walls and partitions, columns, and ceilings. For requirements on decorations and furnishings see 31-1.2 and 31-1.4.

6-5.1.2* Interior floor finish means the exposed floor surfaces of buildings including coverings which may be applied over a normal finished floor. A finished floor or floor covering on floors shall be exempt from requirements of this section as interior finish provided, however, that (1) in any case where the authority having jurisdiction finds a floor surface of unusual hazard; or (2) where floor finish requirements are specified elsewhere in this *Code* for specific occupancies, the floor surface shall be regulated in accordance with the interior floor finish requirements of this section. (*See Chapters 8 through 30 for specific occupancy requirements.*)

6-5.1.3* Cellular or foamed plastic materials shall not be used as interior finish.

Exception No. 1: Cellular or foamed plastic materials may be permitted on the basis of fire tests that substantiate on a reasonable basis their combustibility characteristics, for the use intended, in actual fire conditions.

Exception No. 2: Cellular or foamed plastic may be used for trim, not in excess of 10 percent of the wall or ceiling area, provided it is not less than 20 lb/cu ft (320 kg/m³) in density, is limited to ½ in. (1.3 cm) in thickness, 4 in. (10.2 cm) in width and complies with the requirements for Class A or B interior finish; however, the smoke rating is not limited.

6-5.1.4 The classification of interior finish materials specified in 6-5.2.1 shall be that of the basic material used by itself or in combination with other materials.

Exception No. 1: Subsequently applied paint or wall covering not exceeding 1/28 in. (.09 cm) in thickness.

Exception No. 2: The authority having jurisdiction shall include such finishes in the determination of classification in any case where in the opinion of the authority having jurisdiction they are of such character or thickness or so applied as to affect materially the flame spread or smoke development characteristics.

6-5.2 Interior Finish Classification.

6-5.2.1* Interior finish materials shall be grouped in the following classes in accordance with their flame spread and smoke development:

Class A Interior Finish. Flame spread 0-25, smoke developed 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 described in 6-5.2.2. Any element thereof when so tested shall not continue to propagate fire.

Class B Interior Finish. Flame spread 26-75, smoke developed 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 described in 6-5.2.2.

Class C Interior Finish. Flame spread 76-200, smoke developed 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 described in 6-5.2.2.

Exception: Existing interior finishes complying with the above flame spread ratings only may be continued in use.

6-5.2.2* Interior finish materials as specified in 6-5.2.1 shall be classified in accordance with NFPA 255, *Method of Test of Surface Burning Characteristics of Building Materials.*

6-5.2.3* Any interior finish material shown by test to present an unreasonable life hazard due to the character of the products of decomposition shall be used only with the approval of the authority having jurisdiction.

6-5.2.4* Classification of interior finish materials shall be in accordance with tests made under conditions simulating actual installations, provided that the authority having jurisdiction may by rule establish the classification of any material on which a rating by standard test is not available.

6-5.3 Interior Floor Finish Classification.

6-5.3.1 Interior floor finishes shall be grouped in the following classes in accordance with the critical radiant flux ratings:

Class I Interior Floor Finish. Critical radiant flux, minimum of 0.45 watts per square centimeter as determined by the test described in 6-5.3.2.

Class II Interior Floor Finish. Critical radiant flux, minimum of 0.22 watts per square centimeter as determined by the test described in 6-5.3.2.

6-5.3.2* Critical radiant flux test ratings, as specified in 6-5.3.1, shall be classified in accordance with NFPA 253, *Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.*

6-5.4 Fire Retardant Coatings.

6-5.4.1 The required flame spread or smoke developed classification of surfaces may 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 Chapter 3, NFPA 703, *Standard for Fire Retardant Impregnated Wood and Fire Retardant Coatings for Building Materials.*

6-5.4.2 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.

6-5.5 Automatic Sprinklers.

6-5.5.1 Where a complete standard system of automatic sprinklers is installed, Class C interior finish materials may be used in any location where Class B is normally specified, and Class B interior finish materials may be used in any location where Class A is normally specified.

Exception: Unless specifically prohibited elsewhere in this Code.

6-5.5.2 Where a complete standard system of automatic sprinklers is installed, Class II interior floor finish may be used in any location where Class I interior floor finish is normally specified, and where Class II is normally specified, no critical radiant flux rating is required.

6-5.6 Trim and Incidental Finish. Interior finish not in excess of 10 percent of the aggregate wall and ceiling areas of any room or space may be Class C materials in occupancies where interior finish of Class A or Class B is required.

6-5.7* Use of Interior Finishes.

6-5.7.1 Interior finish material shall be used in accordance with requirements for individual classes of occupancy specified elsewhere in the *Code*. Wherever the use of Class C interior finish material is specified, Class A or B shall be permitted; where Class B interior finish is specified, Class A shall be permitted; and similarly, where Class II floor finish is specified, Class I materials shall be permitted.

6-5.7.2 Materials such as carpeting having a napped, tufted, looped, or similar surface, when applied on walls or ceilings, shall meet the requirements of Class A interior finish.

CHAPTER 7 BUILDING SERVICE AND FIRE PROTECTION EQUIPMENT

SECTION 7-1 UTILITIES

7-1.1 Equipment utilizing gas and related gas piping shall be installed in accordance with NFPA 54, *National Fuel Gas Code*, or NFPA 58, *Standard for Storage and Handling of Liquefied Petroleum Gases.*

Exception: Existing installations may be continued in service, subject to approval by the authority having jurisdiction.

7-1.2 Electrical wiring and equipment installed shall be in accordance with NFPA 70, *National Electrical Code.*

Exception: Existing installations may be continued in service subject to approval by the authority having jurisdiction.

SECTION 7-2 HEATING, VENTILATING, AND AIR CONDITIONING

7-2.1 Air conditioning, heating, ventilating ductwork, and related equipment shall be installed 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.

Exception: Existing installations may be continued in service, subject to approval by the authority having jurisdiction.

7-2.2 Ventilating or heat-producing equipment shall be installed in accordance with: NFPA 91, *Standard for the Installation of Blower and Exhaust Systems*; NFPA 211, *Standard for Chimneys, Fireplaces, and Vents*; NFPA 31, *Standard for Oil Burning Equipment*; NFPA 54, *National Fuel Gas Code*; NFPA 70, *National Electrical Code*, as applicable.

Exception: Existing installations may be continued in service, subject to approval by the authority having jurisdiction.

7-2.3 Commercial cooking equipment for use in occupancies shall be installed in accordance with NFPA 96, *Standard for the Installation of Equipment for the Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment.*

Exception: Existing installations may be continued in service, subject to approval by the authority having jurisdiction.

SECTION 7-3 SMOKE CONTROL

7-3.1* Smoke control systems may be installed in lieu of other specific requirements in accordance with the provisions of Chapters 8 through 30. The design, installation and testing shall be approved by the authority having jurisdiction.

SECTION 7-4 ELEVATORS, DUMBWAITERS, AND VERTICAL CONVEYORS

7-4.1* Elevators shall not be considered a component in the means of egress.

7-4.2 New elevators, escalators, dumbwaiters and moving walks shall be installed in accordance with the requirements of ANSI/ASME A17.1, *Safety Code for Elevators and Escalators.*

7-4.3 Existing elevators, escalators, dumbwaiters and moving walks shall conform to the requirements of ANSI/ASME A17.1, *Safety Code for Elevators and Escalators*, Part X "Acceptance and Periodic Test and Inspections and Maintenance" and Part XII "Alterations, Repairs and Replacements."

7-4.4 All elevators having a travel 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 requirements of ANSI/ASME A17.1, *Safety Code for Elevators and Escalators*, Rule 211.3 "Operation of Elevators Under Fire or Other Emergency Conditions."

7-4.5 Vertical conveyors, including dumbwaiters and pneumatic conveyors serving various stories in a building, shall be separately enclosed by walls or partitions in accordance with the provisions of Section 6-2. Service openings shall not open to an exit. Service openings, when required to be open on several stories at the same time for purposes of operation of the conveyor, shall be provided with closing devices that will close all service doors upon activation of smoke detectors that are located inside and outside the shaft enclosure in locations acceptable to the authority having jurisdiction.

SECTION 7-5 RUBBISH CHUTES, INCINERATORS, AND LAUNDRY CHUTES

7-5.1 Each rubbish chute shall be separately enclosed by walls or partitions in accordance with the provisions of Section 6-2. Inlet openings serving chutes shall be protected in accordance with Section 6-2. Doors for such chutes shall open only to a separate room which is designed exclusively for that purpose. The room shall be separated from other spaces in accordance with Section 6-4.

Exception: Existing installations with properly enclosed service chutes and with properly installed and maintained service openings may open to a corridor or normally occupied room, subject to approval by the authority having jurisdiction.

7-5.2 Rubbish chutes, laundry chutes, and incinerators shall be installed and maintained in accordance with NFPA 82, *Standard on Incinerators, Waste and Linen Handling Systems and Equipment.*

Exception: Existing installations may be continued in service, subject to approval by the authority having jurisdiction.

7-5.3 Laundry chutes shall be enclosed and any opening protected as specified for rubbish chutes in 7-5.1.

Exception: Existing installations may be continued in service, subject to approval by the authority having jurisdiction.

SECTION 7-6 DETECTION, ALARM, AND COMMUNICATIONS SYSTEMS

7-6.1 General.

7-6.1.1 The provisions of Section 7-6 shall apply only when specifically required by another section of this *Code.*

7-6.1.2* The provisions of this section cover the basic functions of a complete protective signaling and control system including fire alarm. 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.

7-6.1.3 A fire alarm system required for life safety shall be installed, tested and maintained in accordance with applicable requirements of the following: NFPA 71, *Standard for the Installation, Maintenance and Use of Central Station Signaling Systems*; NFPA 72A, *Standard for the Installation, Maintenance and Use of Local Protective Signaling Systems for Fire Alarm and Supervisory Service*; NFPA 72B, *Standard for the Installation, Maintenance and Use of Auxiliary Protective Signaling Systems for Fire Alarm Service*; NFPA 72C, *Standard for the Installation, Maintenance and Use of Remote Station Protective Signaling Systems*; NFPA 72D, *Standard for the Installation, Maintenance and Use of Proprietary Protective Signaling Systems*; NFPA 72E, *Standard on Automatic Fire Detectors*; NFPA 74, *Standard for the Installation, Maintenance, and Use of Household Fire Warning Equipment*; and NFPA 1221, *Public Fire Service Communications*.

Exception: Existing installations may be continued in use, subject to the approval of the authority having jurisdiction.

7-6.1.4 All systems and components shall be approved for the purpose for which installed.

7-6.1.5 For the purposes of this *Code* a protective signaling and control system is used for initiation, notification and control.

(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 facilities to enhance protection of life.

7-6.1.6 Fire alarm system installation wiring shall be monitored for integrity in accordance with 7-6.1.3.

7-6.2 Signal Initiation.

7-6.2.1 Actuation of the protective system shall occur by any or all of the following means of initiation, when required by another section of this *Code*, but not limited thereto:

(a) Manual fire alarm initiation

(b) Automatic detection

(c) Extinguishing system operation.

7-6.2.2 Manual fire alarm stations 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 are acceptable.

7-6.2.3 A manual fire alarm station shall be provided in the natural path of escape near each required exit from an area unless modified by another section of this *Code*.

7-6.2.4 Additional fire alarm stations shall be so located that, from any part of the building, not more than 200 ft (60 m) horizontal distance on the same floor shall be traversed in order to reach a fire alarm station.

7-6.2.5 Each manual fire alarm station on a system must be accessible, unobstructed, visible, and of the same general type.

7-6.2.6 Where a sprinkler system provides automatic detection and alarm system initiation it shall be provided with an approved alarm initiation device that will operate when the flow of water is equal to or greater than that from a single automatic sprinkler.

7-6.2.7* When required by another section of this *Code*, single station detectors shall be installed in accordance with NFPA 74, *Installation of Household Fire Warning Equipment*. Interconnection of single station detectors shall be permitted only within an individual living unit. Remote annunciation from single station detectors shall be permitted.

7-6.3 Occupant Notification.

7-6.3.1 Actuation of an occupant notification system shall provide signal notification to alert occupants of fire or other emergency as specified by another section of this *Code*.

7-6.3.2* Notification shall be a general audible alarm-type system complying with 7-6.3.3 through 7-6.3.10.

Exception: Except where prohibited by an occupancy chapter, a presignal system shall be permitted when the initial fire alarm signal is transmitted without delay to a local fire department, a fire brigade, or staff personnel trained to respond to a fire emergency (see 7-6.1.3).

7-6.3.3 When a uniform evacuation signal is required by another section of this *Code*, the evacuation signal shall be the uniform fire alarm evacuation signal described in NFPA 72A, *Standard for the Installation, Maintenance and Use of Local Protective Signaling Systems for Fire Alarm and Supervisory Service.*

7-6.3.4 Notification signals for occupants to evacuate shall be by audible signals and, where deemed necessary by the authority having jurisdiction, shall also be by visual signals.

7-6.3.5 The general evacuation alarm signal shall operate throughout the entire building.

Exception No. 1: Where a building is divided by: (1) 2-hour fire barriers into separate fire compartments, or (2) by other means with adequate safeguards against the spread of fire or smoke from one compartment to another, each compartment may be considered a separate building.

Exception No. 2: When total evacuation of occupants is not practical 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. 3: Where occupants are incapable of evacuating themselves because of age, physical/mental disabilities, or physical restraint, only the attendants and other personnel required to evacuate occupants from a zone, area, floor, or building are required to be notified. This notification shall include means to readily identify the zone, area, floor, or building in need of evacuation.

7-6.3.6 Audible alarm indicating devices shall be of such character and so distributed as to be effectively heard above the ambient noise level obtained under normal conditions of occupancy.

7-6.3.7 Audible alarm indicating devices shall produce signals that are distinctive from audible signals used for other purposes in the same building.

7-6.3.8 Pre-recorded or live voice evacuation instructions to occupants shall be permitted. Pre-recorded instructions shall be preceded by not less than 5 seconds or more than 10 seconds of a continuous alerting signal. Upon completion or failure of pre-recorded instructions, the fire alarm evacuation signal shall sound. Pre-recorded instructions shall be repeated two or more times. Live voice instructions shall be permitted to interrupt, delay or discontinue the pre-recorded message or the fire alarm evacuation signal.

7-6.3.9 Audible and visual fire alarm devices shall be used only for fire alarm system or other emergency purposes.

Exception No. 1: When a system has a continuously attended central control room with trained operators, selective paging is permitted.

Exception No. 2: Where otherwise permitted by another section of this Code.

7-6.3.10 Alarm notification signals shall take precedence over all other signals.

7-6.4* Emergency Forces Notification. When specified by another section of this *Code*, actuation of emergency forces notification shall provide signal notification to alert the local fire brigade or municipal fire department of fire or other emergency.

When fire department notification is required by another section of this *Code*, the fire alarm system shall be arranged to automatically transmit an alarm to the municipal fire department via any of the following means:

(a) An auxiliary alarm system (*per NFPA 72B, Standard for the Installation, Maintenance and Use of Auxiliary Protective Signaling Systems*), or

(b) A central station connection (*per NFPA 71, Standard for the Installation, Maintenance, and Use of Central Station Signaling Systems*), or

(c) A proprietary system operator (*per NFPA 72D, Standard for the Installation, Maintenance and Use of Proprietary Protective Signaling Systems*), or

(d) A remote station connection (*per NFPA 72C, Standard for the Installation, Maintenance and Use of Remote Station Protective Signaling Systems*).

Exception: When none of the above means of notification are available, a plan for notification of the municipal fire department, acceptable to the authority having jurisdiction, shall be provided.

7-6.5 Emergency Control.

7-6.5.1 A signaling system shall, when required by another section of this *Code*, be arranged to automatically actuate control functions necessary to make the protected premises safer for building occupants.

7-6.5.2 When required by another section of this *Code*, the following functions shall be actuated by the fire alarm system:

(a) Elevator capture and control in accordance with ASME/ANSI A17.1, *Safety Code for Elevators and Escalators*

(b) Release of automatic door closers

(c) Stairwell or elevator shaft pressurization

(d) Smoke management or smoke control systems

(e) Initiation of automatic fire extinguishing equipment

(f) Emergency lighting control

(g) Unlocking of doors

(h) Emergency shut off of gas and fuel supplies that may be hazardous providing the continuation of service is not essential to the preservation of life.

7-6.5.3 The functions specified in 7-6.5.2 are permitted to be activated by any fire alarm system when otherwise not required by this *Code*.

7-6.5.4 The performance of emergency control functions shall not, in any way, impair the effective response of all required alarm notification functions.

7-6.5.5* The wiring to required emergency control devices shall be monitored to within 3 ft (91 cm) of the device to be actuated.

7-6.6 Location of Controls.

7-6.6.1 Operator controls, visual alarm annunciators, and manual communications capability shall be installed in a control center at a convenient location. Controls used by the fire department shall be located adjacent to an entrance as designated by the authority having jurisdiction.

7-6.6.2 When central controls are located in areas not continuously occupied, automatic detection shall be provided for the central controls. A detector shall be provided for each central controls location.

SECTION 7-7 AUTOMATIC SPRINKLERS AND OTHER EXTINGUISHING EQUIPMENT

7-7.1 Automatic Sprinklers.

7-7.1.1* Each automatic sprinkler system required by another section of this *Code* shall be installed in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*, or, where applicable, NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Mobile Homes*. When partial sprinkler protection is permitted by another section of this *Code*, 4-1.2 of NFPA 13 shall apply.

7-7.1.2 Sprinkler piping serving not more than six sprinklers for any isolated hazardous area may be connected directly to a domestic water supply system having a capacity sufficient to provide 0.15 gal per minute per sq ft (6.1 L/min sq m) of floor area throughout the entire enclosed area. An indicating shut-off valve shall be installed in an accessible location between the sprinklers and the connection to the domestic water supply.

7-7.1.3* In areas protected by automatic sprinklers, automatic heat detection devices required by other sections of this *Code* may be deleted.

7-7.1.4* Where automatic sprinkler protection is provided, other requirements of this *Code* may be modified to such extent as permitted by the provisions of this *Code*.

7-7.2 Supervision.

7-7.2.1* When supervised automatic sprinkler protection is required by another section of this *Code*, a distinct supervisory signal shall be provided to indicate a condition that will impair the satisfactory operation of the sprinkler system. This shall include, but not be limited to, monitoring of control valves, fire pump power supplies and running conditions, water tank levels and temperatures, pressure of pressure tanks, and air pressure on dry-pipe valves.

7-7.2.2 Supervisory signals for sprinkler systems shall terminate in a location within the protected building or premises which is constantly attended by qualified personnel in the employ of the owner or shall terminate in an approved remote receiving facility.

7-7.2.3 When supervised automatic sprinkler protection is required by another section of this *Code*, waterflow alarms shall be transmitted to an approved proprietary alarm receiving facility, remote station, central station, or the fire department. Such connections shall be installed in accordance with 7-6.1.3.

7-7.3* Other Automatic Extinguishing Equipment. In any occupancy where the character of the potential fuel for fire is such that extinguishment or control of fire may be more effectively accomplished by a type of automatic extinguishing system other than an automatic sprinkler system such as carbon dioxide, dry chemical, foam, Halon 1301, or water spray, a standard extinguishing system of other type may be installed in lieu of an automatic sprinkler system. Such systems shall be installed in accordance with appropriate NFPA standards.

7-7.4 Manual Extinguishing Equipment.

7-7.4.1* When required by the provisions of another section of this *Code*, portable fire extinguishers shall be installed in accordance with NFPA 10, *Standard for the Installation of Portable Fire Extinguishers.*

7-7.4.2 When 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 and Hose Systems.*

CHAPTER 8 NEW ASSEMBLY OCCUPANCIES

(See also Chapter 31.)

SECTION 8-1 GENERAL REQUIREMENTS

8-1.1 Application. The requirements of this chapter apply to new assembly occupancies. *(See 8-1.3 for definition.)*

8-1.2 Mixed Occupancies. *(See also 1-4.7.)*

8-1.2.1* 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 so located, separated, or protected as to avoid any undue danger to the occupants of the assembly occupancy from a fire originating in the other occupancy or smoke therefrom.

8-1.2.2 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 classed as part of the other occupancy and subject to the provisions applicable thereto.

8-1.2.3 Assembly occupancies in buildings of other occupancy may 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*.

8-1.2.4 Exits shall be sufficient for simultaneous occupancy of both the assembly occupancy and other parts of the building.

Exception: Where the authority having jurisdiction determines that the conditions are such that simultaneous occupancy will not occur.*

8-1.3 Special Definitions.

Assembly Occupancies. Include, but are not limited to, all buildings or portions of buildings used for gathering together 50 or more persons for such purposes as deliberation, worship, entertainment, dining, amusement, or awaiting transportation.

Fly. The space over the stage of a theater where scenery and equipment can be hung out of view. Also called lofts and rigging lofts.

Fly Gallery. A narrow raised platform at the side of a legitimate stage from which the lines for flying scenery are manipulated.

Gridiron. The arrangement of beams over a legitimate stage supporting the machinery for flying scenery and hanging battens from which lighting is hung.

Nightclub. An establishment primarily engaged in the retail sale of beverages, which provides entertainment and where any service of food is incidental to the entertainment. Such establishments include, but are not limited to, cabarets, discotheques, beer gardens, show rooms and like establishments.

Pinrail. A beam at one side of a legitimate stage through which wooden or metal pins are driven and to which lines from the flies are fastened.

Platform.* That raised area within a building used for the presentation of music, plays or other entertainment; the head table for special guests; the raised area for lectures and speakers; boxing and wrestling rings; theater-in-the-round; and similar purposes wherein there are no overhead hanging curtains, drops, scenery or stage effects other than lighting.

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

Platform, Permanent. A platform erected within an area for more than 30 days.

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

Restaurant. A food or a food and beverage establishment which may or may not provide entertainment and where the entertainment is incidental to food and beverage service.

Stage. A partially enclosed area within a building used for the purpose of entertainment and shall be classified as either:

(a) *Stage, Legitimate.* A stage wherein curtains, drops, leg drops, scenery, lighting devices or other stage effects are retractable horizontally or suspended overhead.

(b) *Stage, Regular.* A stage wherein curtains, fixed leg drops, valances, scenery and other stage effects are hung and are not usually retractable.

(c) *Stage, Thrust.* A platform extending beyond the proscenium arch and into the audience.

(d) *Stage, Temporary.* A stage erected for a period of not more than 30 days.

8-1.4 Classification of Occupancy. *(See 4-1.2.)*

8-1.4.1 Classification of Assembly Occupancies. Each assembly occupancy shall be classified according to its occupant load, as follows: Class A, occupant load greater than 1000 persons; Class B, occupant load greater than 300 but not greater than 1000 persons; Class C, occupant load greater than 50 but not greater than 300 persons.

8-1.5 Classification of Hazard of Contents. Contents of assembly occupancies shall be classified in accordance with the provisions of Section 4-2.

8-1.6 Minimum Construction Requirements *(see 6-2.1)*. The location of an assembly occupancy shall be limited as follows:

Type of Construction	Below LED	LED	Number of Levels Above LED 1	2	3	4 & Above
I (443) I (332) II (222)	A†B†C† Any Number of Levels	ABC	ABC	ABC	ABC	A†B†C
II (111)	A†B†C† One Level Below LED	ABC	ABC	A†BC	B†C†	N.P.
III (211) IV (2HH) V (111)	A†B†C† One Level Below LED	ABC	ABC	A†B†C	B†C†	N.P.
II (000)	B†C† One Level Below LED	A†BC	C†	N.P.	N.P.	N.P.
III (200) V (000)	B†C† One Level Below LED	BC	C†	N.P.	N.P.	N.P.

†Permitted if all the following are protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 7-7:
(a) The level of the assembly occupancy, and
(b) Any level below the level of the assembly occupancy, and
(c) 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.
N.P. — Not Permitted
LED — Level of Exit Discharge

8-1.7 Occupant Load.

8-1.7.1 The occupant load permitted in any assembly building, structure, or portion thereof shall be determined by dividing the net floor area or space assigned to that use by the square foot (square meter) per occupant as follows:

(a) An assembly area of concentrated use without fixed seats such as an auditorium, church, chapel, dance floor, discotheque or lodge room — 7 sq ft (.65 sq m) per person.

(b) An assembly area of less concentrated use such as a conference room, dining room, drinking establishment, exhibit room, gymnasium, or lounge — 15 sq ft (1.4 sq m) per person.

(c) Bleachers, pews, and similar bench-type seating — 18 linear in. (45.7 linear cm) per person.

(d) Fixed Seating. The occupant load of an area having fixed seats shall be determined by the number of fixed seats installed. Required aisle space serving the fixed seats shall not be used to increase the occupant load.

(e) Libraries. In stack areas — 100 sq ft (9.3 sq m) per person; in reading rooms — 50 sq ft (4.6 sq m) per person.

8-1.7.2 The occupant load permitted in a building or portion thereof may be increased above that specified in 8-1.7.1 if the necessary aisles and exits are provided but shall not exceed a density of 1 person per 5 sq ft (.46 sq m). To increase the occupant load, a diagram indicating placement of equipment, aisles, exits, and seating shall be provided to and approved by the authority having jurisdiction prior to any increase in occupant load.

8-1.7.3 Waiting Spaces. In theaters and other assembly occupancies where persons are admitted to the building at times when seats are not available to them, or when the permitted occupant load has been reached based on 8-1.7.1 or 8-1.7.2, and are allowed to wait in a lobby or similar space until seats or space are available, such use of lobby or similar space shall not encroach upon the required clear width of exits. Such waiting shall be restricted to areas other than the required means of egress. Exits shall be provided for such waiting spaces on the basis of one person for each 3 sq ft (0.28 sq m) 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.

SECTION 8-2 MEANS OF EGRESS REQUIREMENTS

8-2.1 General. All means of egress shall be in accordance with Chapter 5 and this chapter.

8-2.2* Types of Exits.

8-2.2.1 Exits of the specified number and width shall be of one or more of the following types, in accordance with the provisions of Chapter 5 of this *Code*:

(a) Doors (*see 5-2.1*)

(b) Revolving doors (*see 5-2.1.10*)

(c) Stairs (*see 5-2.2*)

(d) Smokeproof enclosures (*see 5-2.3*)

(e) Horizontal exits (*see 5-2.4*)

(f) Ramps. Class A for Class A assembly occupancies; Class B for Class B and Class C assembly occupancies (*see 5-2.5*)

(g) Exit passageways (*see 5-2.6*).

8-2.2.2 Turnstiles. No turnstiles or other devices to restrict the movement of persons shall be installed in any assembly occupancy in such a manner as to interfere in any way with required means of egress facilities.

8-2.3 Capacity of Means of Egress.

8-2.3.1 The capacity of means of egress shall be in accordance with Section 5-3.

8-2.3.2 Main Exit. Every assembly occupancy shall be provided with a main exit. The main exit shall be of sufficient width to accommodate one-half of the total occupant load but shall be not less than the total required width of all aisles, exit passageways, and stairways leading thereto and shall be at the level of exit discharge or shall connect to a stairway or ramp leading to a street.

Exception No. 1: A bowling establishment shall have a main exit of sufficient capacity to accommodate 50 percent of the total occupant load without regard to the number of aisles which it serves.

Exception No. 2: In assembly occupancies such as stadiums, sports arenas, and passenger stations, exits may be distributed around the perimeter of the building provided the total exit width provides 116⅔ percent of the width needed to accommodate the permitted occupant load.

8-2.3.3 Other Exits. Each level of an assembly occupancy shall have access to the main exit and shall be provided with

exits of sufficient width to accommodate two-thirds of the total occupant load served by that level. Such exits shall discharge in accordance with 8-2.7. Such exits shall be located as far apart as practicable and as far from the main exit as practicable. Such exits shall be accessible from a cross aisle or a side aisle. (*See 8-2.3.2.*)

Exception: Where only two exits are required, each exit shall be of sufficient width to accommodate not less than half the total occupant load.

8-2.4 Number of Exits.

8-2.4.1 Every Class A assembly occupancy shall have at least four separate means of egress as remote from each other as practicable.

8-2.4.2 Every Class B assembly occupancy shall have at least two separate means of egress as remote from each other as practicable and, if of a capacity of over 500, at least three separate means of egress, each not less than two exit units wide.

8-2.4.3* Every Class C assembly occupancy shall have at least two means of egress consisting of separate exits or doors leading to a corridor or other spaces giving access to two separate and independent exits in different directions.

8-2.5 Arrangement of Means of Egress.

8-2.5.1 Exits shall be remote from each other and shall be arranged to minimize the possibility that they may be blocked by any emergency.

Exception: A common path of travel may be permitted for the first 20 ft (6.1 m) from any point.

8-2.5.2 Means of egress shall not be permitted through kitchens, storerooms, restrooms, closets, or hazardous areas as described in 8-3.2.

8-2.5.3 Seating.

(a) The spacing of rows of chairs shall provide a space of not less than 12 in. (30.5 cm) from the back of one chair to the front of the most forward projection of the chair immediately behind it. The rows of chairs shall be spaced not less than 33 in. (84 cm) back to back. Horizontal measurements shall be made between vertical planes. When all chairs in a row have automatic or self-rising seats, the measurement may be made with seats in the up position. When any chair in the row does not have an automatic or self-rising seat, then the measurement shall be made with the seat in the down position.

(b) Rows of chairs between aisles shall have not more than 14 chairs.

(c) Rows of chairs opening onto an aisle at one end only shall have not more than seven chairs.

(d) Chairs without dividing arms shall have their capacity determined by allowing 18 in. (45.7 cm) per person.

(e) Where bleacher or grandstand seating without backs is used indoors, rows of seats shall be spaced not less than 22 in. (55.9 cm) nor more than 30 in. (76 cm) back to back. Vertical aisles shall be provided when such seating is more than eleven rows high. Vertical aisles, where provided, shall not have a dead end in excess of sixteen rows. The rise per row shall not exceed 12 in. (30.5 cm).

Exception: Folding or telescopic seating shall comply with NFPA 102, Standard for Assembly Seating, Tents, and Air-Supported Structures, with a limit of dead ends in vertical aisles of sixteen rows.

(f) Continental Seating.

1. With continental seating, the spacing of rows of unoccupied chairs shall provide a clear width between rows measured horizontally as follows (automatic or self-rising seats shall be measured in the seat-up position; other seats shall be measured in the seat-down position): 18-in. (45.7-cm) clear width between rows of 18 chairs or less; 20-in. (50.8-cm) clear width between rows of 35 chairs or less; 21-in. (53.3-cm) clear width between rows of 45 chairs or less; 22-in. (55.9-cm) clear width between rows of 46 chairs or more, and

2. There shall be not more than 100 chairs in a row between aisles at both sides of the seating area, and

3. Exit doors shall be provided along each side aisle of the row of chairs at the rate of one pair of exit doors for each five rows of chairs. There shall be not more than five chair rows between pairs of doors. Such exit doors shall provide a minimum clear width of 66 in. (168 cm) discharging into a foyer, lobby, or to the exterior of the building.

8-2.5.4* Tablet-Arm Chair Seating. Tablet-arm chairs shall not be permitted where continental seating is used unless full compliance with row spacing requirements is provided when the table arm is in the usable position. Tablet-arm chairs which do not have a stored position for the tablet-arm shall not be permitted unless the required 12-in. (30.5-cm) clearance between rows of chairs is provided and maintained.

8-2.5.5 Aisles.

8-2.5.5.1 Every portion of any assembly occupancy that contains theater and similar type seating facilities shall be provided with aisles leading to exits in accordance with 8-2.5.5.2 through 8-2.5.5.5.

8-2.5.5.2 When serving more than 60 chairs, every aisle shall be not less than 3 ft (91 cm) wide when serving chairs on one side only, and not less than 3 ft 6 in. (107 cm) wide when serving chairs on both sides. Such minimum width shall be measured at the point farthest from an exit, cross aisle, or foyer and shall be increased in width by 1½ in. (3.8 cm) for each 5 ft (152 cm) in length toward the exit, cross aisle, or foyer. When serving 60 seats or less, aisles shall be not less than 30 in. (76 cm) wide. On aisles where egress is possible in either direction, their width shall be uniform.

8-2.5.5.3 Aisles shall terminate in a cross aisle, foyer, or exit. The width of such cross aisle, foyer, or exit shall be not less than the sum of the required width of the widest aisle plus 50 percent of the total required width of the remaining aisles that it serves.

8-2.5.5.4 No dead-end aisle shall be greater than 20 ft (6.1 m) in length. In arena or thrust stage theaters, dead-end aisles at the stage shall not exceed five rows beyond a cross aisle.

8-2.5.5.5 With continental seating as set forth in 8-2.5.3(f), side aisles shall be not less than 44 in. (112 cm) in width.

8-2.5.5.6 Every portion of an assembly occupancy that contains table and chair-type seating facilities or tables, displays, equipment or other similar materials shall be provided with aisles leading to exits in accordance with 8-2.5.5.7 through 8-2.5.5.9.

8-2.5.5.7* Fixed or loose chairs, tables and similar furnishings or equipment shall be so arranged and maintained that a path of travel to an aisle or exit is provided. The path of travel shall not exceed 10 ft (3 m) from any point to an aisle or exit.

8-2.5.5.8* Rectangular banquet-type tables used for drinking or dining or purposes having similar seating configurations where the path of travel to an aisle exceeds 10 ft (3 m) shall be spaced not less than 54 in. (137 cm) apart where seating occurs back-to-back nor less than 36 in. (91 cm) where seating is on one side only. The path of travel to an aisle or exit shall not exceed 20 ft (6.1 m).

8-2.5.5.9* Width of Aisles. The width of aisles shall be sized in accordance with 5-3.2 and 8-2.3.1 but shall not be less than 36 in. (91 cm) in clear unobstructed width. When loose seating occurs bordering on the aisle, the 36-in. (91-cm) aisle is required plus an additional 19 in. (48.3 cm) for a chair on one side of the aisle or an additional 38 in. (97 cm) for chairs on both sides of the aisle.

8-2.5.5.10 Aisle Stairs and Ramps. Every aisle with a gradient 1 in 8 or less shall consist of a ramp. Every aisle with a gradient exceeding 1 in 8 shall consist of a stair having treads, risers, and handrails complying with the following requirements:

(a)* Tread depths shall be uniform in each aisle.

Exception No. 1 to (a): In aisle stairs where single intermediate treads are provided halfway between seating platforms such intermediate treads may have a relatively smaller but uniform depth but not less than 13 in. (33.0 cm).

Exception No. 2 to (a): Nonuniformities or tolerances shall not exceed 3/16 in. (0.5 cm) in adjacent treads.

(b)* Treads shall be a minimum of 11 in. (27.9 cm).

(c) Riser height shall be a minimum of 4 in. (10.2 cm).

(d) Riser height shall not exceed 8 in. (20.3 cm).

Exception No. 1 to (d): Where the gradient of an aisle exceeds 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 may exceed 8 in. (20.3 cm) but not exceed 11 in. (27.9 cm).

Exception No. 2 to (d): Folding or telescopic seating in accordance with NFPA 102, Standard for Assembly Seating, Tents, and Air-Supported Structures.

(e) Riser height shall be uniform within a flight.

Exception No. 1 to (e): Riser height may be nonuniform but only to the extent necessary by changes in gradient within a seating area to maintain necessary sight lines. Where nonuniformities exceed 3/16 in. (0.5 cm) between adjacent risers the exact location of such nonuniformities shall be indicated with a distinctive marking stripe on each tread at the nosing or leading edge adjacent to the nonuniform risers.

Exception No. 2 to (e): Nonuniformity or tolerances shall not exceed 3/16 in. (0.5 cm) in adjacent risers.

(f)* Aisle stairs shall be provided with handrails at one side or along the centerline complying with 5-2.2.6; however, such handrails may be discontinuous where they are provided along the centerline of such aisles. The gaps between adjacent sections of such discontinuous handrails shall not be less than 22 in. (55.9 cm) and not greater than 36 in. (91 cm) measured horizontally.

Exception to (f): Handrails may be omitted when risers do not exceed 7 in. (17.8 cm) in height.

(g)* A contrasting marking stripe shall be provided on each tread at the nosing or leading edge such that the location of such tread is readily apparent particularly when viewed in descent. Such stripe shall be at least 1 in. (2.5 cm) wide and not exceed 2 in. (5 cm) wide.

Exception to (g): The marking stripe may be omitted where tread surfaces and environmental conditions in all conditions of use are such that the location of each tread is readily apparent particularly when viewed in descent.

8-2.5.5.11 When 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 this section and shall constitute the only acceptable arrangement until revised or additional plans are submitted and approved.

Exception: Temporary deviations from the specifics of the approved plans shall be permitted provided the occupant load is not increased and the intent of this section is maintained.

8-2.6 Travel Distance to Exits. Exits shall be so arranged that the total length of travel from any point to reach an exit will not exceed 150 ft (45 m) in any assembly occupancy.

Exception: The travel distance may be increased to 200 ft (60 m) in assembly occupancies protected throughout by an approved automatic sprinkler system.

8-2.7 Discharge from Exits.

8-2.7.1 Exit discharge shall comply with Section 5-7.

8-2.7.2 A maximum of 50 percent of the exits may discharge through areas on the level of exit discharge in accordance with 5-7.2.

8-2.7.3 The level of exit discharge shall be measured at the point of principal entrance to the building.

8-2.7.4 Where the principal entrance to an assembly occupancy is via a depressed terrace, the terrace shall be at least as wide as the exit that it serves, but not less than 5 ft (152 cm) wide, and it shall be increased in width by 50 percent of any other exits tributary thereto. The level of the terrace shall be considered the level of exit discharge for the purpose of 8-1.6 above.

8-2.8 Illumination of Means of Egress.

8-2.8.1 Illumination of means of egress in assembly occupancies shall be provided in accordance with Section 5-8.

8-2.8.2 In every auditorium or other assembly occupancy where pictures, motion pictures, or other projections are made by means of directed light, the illumination of the floors of exit

access may be reduced during such period of projection to values of not less than ⅕ footcandle (2.2 lx).

8-2.9 Emergency Lighting. All assembly occupancies and their means of egress shall be provided with emergency lighting in accordance with Section 5-9.

Exception: Class C assembly occupancies, used exclusively for religious worship, shall not be required to have emergency lighting.

8-2.10 Marking of Means of Egress. Means of egress shall have signs in accordance with Section 5-10.

8-2.11 Special Features.

8-2.11.1 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 may be provided with a latch or lock only if it is panic hardware or fire exit hardware.

Exception No. 1: In assembly occupancies having an occupant load not greater than 500, when the main exit consists of a single door or single pair of doors, locking devices in accordance with 5-2.1.5.1 Exception No. 2 may be used on the main exit. Any latching device on this door(s) shall be released by panic hardware.

Exception No. 2: Special locking arrangements complying with 5-2.1.6 are permitted on doors other than main exit doors.

8-2.11.2 Class C assembly occupancies in covered malls (*see 24-4.3.1 Exception*) may have horizontal or vertical security grilles or doors on the main entrance/exits in accordance with 5-2.1.4.1 Exception No. 3.

8-2.11.3 Railings.

(a) The fasciae of boxes, balconies, and galleries shall not be less than 26 in. (66 cm) high above the adjacent floor or have substantial railings not less than 26 in. (66 cm) high above the adjacent floor.

(b) The height of the rail above footrests on the adjacent floor immediately in front of a row of seats shall be no less than 26 in. (66 cm). Railings at the ends of aisles shall not be 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.

(c) Cross aisles shall be provided with railings not less than 26 in. (66 cm) high above the adjacent floor.

Exception: Where the backs of seats on the front of the aisle project 24 in. (60 cm) or more above the adjacent floor of the aisle.

SECTION 8-3 PROTECTION

8-3.1 Protection of Vertical Openings. All interior stairways and other vertical openings shall be enclosed and protected as provided in Section 6-2.

Exception No. 1: Unprotected openings connecting not more than three floors may be permitted provided that they comply with 6-2.2.3.4.

Exception No. 2: Atriums in accordance with 6-2.2.3.5 are permitted.

Exception No. 3: Stairs may be open between balconies and main assembly floors in theaters, churches, or auditoriums where the travel distance is within the allowable limits (see 8-2.6).

8-3.2 Protection from Hazards.

8-3.2.1 Stages and Platforms. (*See 8-1.3.*)

8-3.2.1.1 Materials and Design. Materials used in the construction of platforms and stages shall conform to the applicable requirements of the local building code.

8-3.2.1.2 Platform Construction. Temporary platforms may be constructed of any materials. The space between the floor and the platform above shall not be used for any purpose other than electrical wiring to platform equipment.

Permanent platforms shall be constructed of materials as required for the type of construction of the building in which the permanent platform is located. When the space beneath the platform is used for storage or any other purpose other than equipment wiring or plumbing, the floor construction shall be not less than 1-hour fire-resistive construction. When the space beneath the platform is not used for any purpose other than equipment wiring or plumbing, the underside of the permanent platform need not be protected.

8-3.2.1.3 Stage Construction. Regular stages and thrust stages shall be constructed of materials as required for the type of construction of the building in which located. In all cases the finish floor may be of wood.

Legitimate stages shall be constructed of materials as 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 may be constructed of steel or heavy timber covered with a wood floor not less than 1½ in. (3.8 cm) in actual thickness.

Openings through stage floors (traps) shall be equipped with tight-fitting trap doors of wood having an actual thickness of not less than 1½ in. (3.8 cm) with approved safety locks.

8-3.2.1.4 Accessory Rooms. Dressing rooms, workshops and store rooms accessory to stages shall be separated from each other and from the stage by not less than 1-hour fire-resistive construction and openings within such separations shall be protected as required for corridors (20-minute fire door assemblies).

Exception: A separation is not required for stages having a floor area not exceeding 500 sq ft (46.5 sq m).

8-3.2.1.5 Vents. Regular and legitimate stages exceeding 500 sq ft (46.5 sq m) in floor area shall be provided with one or more vents constructed of noncombustible material. Ventilators shall be located near the center and above the highest part of the stage. They shall be raised above the stage roof and shall have a total ventilation area equal to at least 5 percent of the floor area of the stage.

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, must be protected against falling onto the stage. A wire screen, if used under the glass, must be so placed that, if clogged, it cannot reduce the required vent area or

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 which may be exerted by springs or counterweights. This minimum counterforce shall be exerted on each door through its entire arc of travel and for a minimum of 115 degrees. A manual control shall also be provided.

Springs, when employed to actuate 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 air stream nor exposed to the outside.

A fusible link shall be placed in the cable control system on the underside of the vents at or above the roof line or as approved by the authority having jurisdiction and shall be so located as not to be affected by the operation of a fire sprinkler system. Remote, manual or electrical controls shall provide for both opening and closing of the vent doors for periodic testing and shall be located at a point on the stage designated by the authority having jurisdiction. When remote control vents are electrical, power failure shall not affect its instant operation in the event of fire. Hand winches may be employed to facilitate operation of manually controlled vents.

8-3.2.1.6 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 at least 4 ft (122 cm) above the roof of the auditorium.

Proscenium walls may have, in addition to the main proscenium opening, one opening at the orchestra pit level and not more than two openings into the auditorium at the legitimate stage floor level. Each such opening shall not be more than 25 sq ft (2.3 sq m) in area.

All openings in the proscenium wall of a legitimate stage shall be protected by a fire assembly having a 1½-hour fire protection rating except that the main proscenium opening used for viewing performances shall be provided with an automatic-closing fire-resistive curtain as described below.

8-3.2.1.7 Proscenium Curtain. The proscenium opening of every stage shall be provided with a curtain constructed and mounted so as to intercept hot gases, flames, and smoke and to prevent glow from a severe fire on the stage showing on the auditorium side within a 5-minute period. The curtain shall be automatic-closing without the use of applied power.

Exception: In lieu of the protection required herein, all the following may be provided:

(a) A noncombustible opaque fabric curtain so arranged that it will close automatically, and

(b) An automatic fixed waterspray deluge system shall be located on the auditorium side of the proscenium opening and be so arranged 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, and

(c) The curtain shall be automatically operated in case of fire by a combination of rate-of-rise and fixed-temperature detectors which also activate the deluge spray system. Stage sprinklers and vents shall be automatically operated in case of fire by fusible elements, and

(d) Operation of the stage sprinkler system or spray deluge valve shall automatically activate the emergency ventilating system and close the curtain, and

(e) The curtain, vents and spray deluge system valve shall also be capable of manual operation.

8-3.2.1.8 Gridirons, Fly Galleries and Pinrails. Gridirons, fly galleries and pinrails shall be constructed of noncombustible materials.

8-3.2.1.9 Fire Protection. Every stage (legitimate, regular, or thrust) larger than 500 sq ft (46.5 sq m) in area shall have a system of automatic sprinklers at the ceiling, in usable spaces under the stage, in auxiliary spaces and dressing rooms, storerooms, and workshops. When there is a stage gridiron, 135°F (57°C) rated sidewall sprinklers with heat-baffle plates shall be installed around the perimeter of the stage, except above the proscenium opening, at points not more than 30 in. (76 cm) below the gridiron, and with sprinklers positioned 4 to 6 in. (10.2 to 15.2 cm) below the baffle plate.

8-3.2.1.10 Special Exiting. Each side of a legitimate stage shall be provided with at least one well marked exit providing not less than 32 in. (81 cm) clear width. Such exit shall open directly to a street, exit court or exit passageway leading to a street.

Fly galleries shall be provided with a means of egress stair not less than 30 in. (76 cm) in width. Each tier of dressing rooms shall be provided with two means of egress meeting the requirements of the *Code*.

Stairways required by this subsection need not be enclosed.

8-3.2.1.11 Flame Retardant Requirements. Combustible scenery of cloth, film, vegetation (dry), foam plastics and similar effects shall meet the requirements of NFPA 701, *Standard Methods of Fire Tests for Flame-Resistant Textiles and Films.*

8-3.2.1.12 Each legitimate or regular stage shall be equipped with a standpipe located on each side of the stage, equipped with a 2½-in. (6.4-cm) fire department connection, and a 1½-in. (3.8-cm) hose for occupant use, installed in accordance with 7-7.4.2.

8-3.2.2 Projection Booths.

8-3.2.2.1 Every assembly occupancy where an electric arc, Xenon, or other light source that generates hazardous gases, dust, or radiation is used shall have a projection room that complies with 8-3.2.2.2, from which the projection shall be made. 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.* (*See also Chapter 31.*)

8-3.2.2.2 Projection Rooms for Safety Film. Projection rooms for safety film shall comply with 8-3.2.2.3 through 8-3.2.2.8.

8-3.2.2.3 Every projection room shall be of permanent construction consistent with the construction requirements for the type of building in which the projection room is located. Openings need not be protected. The room shall have a floor area of not less than 80 sq ft (7.4 sq m) for a single machine and at least 40 sq ft (3.7 sq m) 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 thereto shall have a ceiling height of not less than 7 ft 6 in. (229 cm).

8-3.2.2.4 Each projection room shall have at least one out-swinging, self-closing door not less than 2 ft 6 in. (76 cm) wide by 6 ft 8 in. (203 cm) high.

8-3.2.2.5 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.

8-3.2.2.6 Projection room ventilation shall be not less than the following:

(a) *Supply Air.* Each projection room shall be provided with two or more air supply inlets so arranged as to provide well-distributed air throughout the room. Such inlets shall have screened openings within 12 in. (30.5 cm) of the floor. Air inlet ducts shall provide an amount of air equivalent to the amount of air being exhausted by projection equipment. Air may be taken from the outside; from adjacent spaces within the building provided the volume and infiltration rate is sufficient; or from the building air conditioning system provided it is so arranged as to provide sufficient air when other systems are not in operation.

(b) *Exhaust Air.* Projection booths may be exhausted through the lamp exhaust system. The lamp exhaust system shall be positively interconnected with the lamp so that the lamp will not operate unless there is the air flow 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 may also serve appurtenant rooms such as the generator room and the rewind room.

8-3.2.2.7 Each projection machine shall be provided with an exhaust duct that will draw air from each lamp and exhaust it directly to the outside of the building. The lamp exhaust may serve to exhaust air from the projection room to provide room air circulation. Such ducts shall be of ridged materials, except for a flexible connector approved for the purpose. The lamp exhaust system shall not be interconnected with any other system.

(a) *Electric Arc Projection Equipment.* The exhaust capacity shall be 200 cfm (.09 cu m/s) for each lamp connected to the lamp exhaust system, or as recommended by the equipment manufacturer. Auxiliary air may 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 cfm (.14 cu m/s) per lamp, or not less than that exhaust volume required or recommended by the equipment manufacturer, whichever is the greater.

8-3.2.2.8 Miscellaneous Equipment and Storage.

(a) Each projection room shall be provided with rewind and film storage facilities.

(b) A maximum of four containers for flammable liquids of not greater than 16 oz (.5 L) capacity and of a nonbreakable type may be permitted in each projection booth.

(c) Appurtenant electrical equipment such as rheostats, transformers, and generators may be located within the booth or in a separate room of equivalent construction.

8-3.2.3 Service Equipment, Hazardous Operations or Processes, and Storage Facilities.

8-3.2.3.1 Rooms containing high-pressure boilers, refrigerating machinery of other than domestic refrigerator type, large transformers, or other service equipment subject to possible explosion shall not be located directly under or adjacent to required exits. All such rooms shall be separated by a 1-hour fire barrier from other parts of the building.

8-3.2.3.2 All openings between the balance of the building and rooms or enclosures for hazardous operations or processes shall be protected by standard self-closing or smoke-actuated fire doors and shall be provided with adequate vents to the outer air, in accordance with Section 6-4 of this *Code*.

8-3.2.3.3 Rooms or spaces for the storage, processing, or use of the materials specified in this section shall be protected in accordance with the following:

(a) Rooms or spaces used for the storage of combustible supplies in quantities deemed hazardous by the authority having jurisdiction, hazardous materials in quantities deemed hazardous by recognized standards, or fuel shall be separated from the remainder of the building by construction having not less than a 1-hour fire resistance rating with all openings protected by self-closing or smoke-actuated fire doors, or such rooms or spaces may be protected by an automatic extinguishing system as set forth in Section 6-4.

(b) Rooms or spaces used for processing or use of combustible supplies in quantities considered hazardous by the authority having jurisdiction, hazardous materials, or flammable or combustible liquids in quantities deemed hazardous by recognized standards shall be separated from the remainder of the building by construction having not less than a 1-hour fire resistance rating with all openings protected by self-closing or smoke-actuated fire doors and shall also be protected by an automatic extinguishing system as set forth in Section 6-4.

(c) Boiler and furnace rooms, laundries, and maintenance shops, including woodworking and painting areas, shall be separated from the remainder of the building by construction having not less than a 1-hour fire resistance rating with all openings protected by self-closing or smoke-actuated fire doors.

Exception to (c): Rooms enclosing air-handling equipment.

(d) When automatic extinguishing systems are used to meet the requirements of this section, the rooms or spaces shall be separated from the remainder of the building by a smoke barrier.

8-3.2.4 Special Provisions for Food Service Establishments.

8-3.2.4.1 All devices in connection with the preparation of food shall be so installed and operated as to avoid hazard to the safety of occupants.

8-3.2.4.2 All devices in connection with the preparation of food shall be of an approved type and shall be installed in an approved manner.

8-3.2.4.3 Food preparation facilities shall be protected in accordance with 7-2.3 and are not required to have openings protected between food preparation areas and dining areas.

8-3.3 Interior Finish.

8-3.3.1 The interior finish requirements of this section shall be in accordance with Section 6-5.

8-3.3.2 Interior finish in all corridors and lobbies shall be Class A or B and in enclosed stairways Class A.

8-3.3.3 Interior finish in general assembly areas of Class A and B assembly occupancies shall be Class A or B. In Class C assembly occupancies it shall be Class A, B, or C.

Exception: In any assembly occupancy, exposed portions of structural members complying with the requirements for Type IV (2HH) construction may be permitted.

8-3.3.4 Screens on which pictures are projected shall comply with requirements of Class A or Class B interior finish.

8-3.4 Detection, Alarm and Communication Systems.

8-3.4.1 General. Assembly occupancies required to be sprinklered by 8-3.5.1, theaters with more than one audience viewing room, and all assembly occupancies of over 2,000 occupant load shall be provided with an approved fire alarm system in accordance with this section.

Exception: Assembly occupancies which are part of another occupancy provided that the fire alarm requirements of that other occupancy are met.

8-3.4.2* Initiation. Initiation of the required fire alarm system shall be by approved means, provided with an emergency power source, capable of transmitting an alarm to a receiving station, located within the building, which is constantly attended when the assembly occupancy is occupied.

8-3.4.3 Notification.

8-3.4.3.1 The required fire alarm system shall sound an audible alarm in a constantly attended receiving station within the building for purposes of initiating emergency action.

8-3.4.3.2 Occupant notification shall be by means of either voice or prerecorded message announcement initiated by the person in the constantly attended receiving station.

8-3.4.3.3 The announcement shall be made via an approved voice communication or public address system, provided with an emergency power source, which is audible above the ambient noise level of the assembly occupancy.

8-3.4.3.4 Where the authority having jurisdiction determines that it is impractical to have a constantly attended location in an assembly occupancy other than a theater, a fire alarm system in accordance with Section 7-6 initiated by manual stations in accordance with 7-6.2.1(a) or other approved means of initiation, which automatically provides prerecorded evacuation instructions in accordance with 7-6.3.8, may be used.

8-3.5 Extinguishment Requirements. (*See 8-1.6, 8-2.6, and 8-3.2.*)

8-3.5.1 Fire Suppression Systems. Every Class A and B assembly occupancy shall be protected throughout by an approved automatic sprinkler system.

Exception No. 1: Auditoriums with fixed seating.

Exception No. 2: Multipurpose assembly occupancies consisting of a single room less than 12,000 sq ft (1100 sq m) and not used for exhibition or display.

Exception No. 3: Passenger terminals at or above grade.

Exception No. 4: Gymnasiums used for no other purpose.

Exception No. 5: Skating rinks and swimming pools used exclusively for participant sport and no audience facilities for more than 300.

Exception No. 6: Class B assembly occupancies used exclusively as restaurants.

SECTION 8-4 SPECIAL PROVISIONS

8-4.1 Windowless or Subterranean Buildings.

8-4.1.1 Windowless or subterranean buildings shall comply with this chapter and Section 30-7.

8-4.1.2 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 contained in 8-4.1.3 through 8-4.1.6.

Exception No. 1: Areas within buildings used only for service to the building such as boiler/heater rooms, cable vaults, dead storage and the like.

Exception No. 2: Auditoriums without intervening occupiable levels complying with the requirements of Chapter 8.

8-4.1.3 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 6-3 and having a 1-hour fire resistance rating.

(a) Each smoke compartment shall have access to at least one exit without passing through the other required compartment. Any doors connecting required compartments shall be tight-fitting, 1-hour minimum fire doors designed and installed to minimize smoke leakage which will close and latch automatically upon detection of smoke.

(b) Each smoke compartment shall be provided with a mechanical means of moving people vertically, such as an elevator or escalator.

(c) Each smoke compartment shall have an independent air supply and exhaust system capable of smoke control or smoke exhaust functions and providing a minimum smoke exhaust rate of six air changes per hour.

(d) Each smoke compartment shall be provided with an automatic smoke detection system throughout. The system

shall be designed such that the activation of any two detectors shall cause the smoke control system to operate and the building voice alarm to sound.

8-4.1.4 The building shall be provided with emergency lighting in accordance with Section 5-9.

8-4.1.5 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.*

8-4.1.6 The building shall be provided with an approved supervised voice alarm system in accordance with Section 7-6. The voice alarm system shall comply with 7-6.3.8. A prerecorded evacuation message shall be provided.

8-4.2 Outdoor Assembly.

8-4.2.1 All grandstands, tents, and other places of outdoor assembly shall comply with the requirements of NFPA 102, *Standard for Assembly Seating, Tents, and Air-Supported Structures.*

8-4.3 Special Provisions for Exhibition Halls.

8-4.3.1 No display or exhibit shall be so installed or operated as to interfere in any way with access to any required exit or with visibility of any required exit or of any required exit sign nor shall any display block access to fire fighting equipment.

8-4.3.2 All displays or exhibits of combustible material or construction and all booths and temporary construction in connection therewith shall be so limited in combustibility or protected as to avoid any undue hazard of fire that might endanger occupants before they have the opportunity to use available exits, as determined by the authority having jurisdiction.

8-4.3.3 A storage room having an enclosure with a smoke barrier having a fire resistance rating of 1 hour and protected by an automatic fire extinguishing system shall be provided for combustible materials not on display.

8-4.4* Special Provisions for the Handicapped. When assembly occupancies are required to be made accessible to the handicapped, the assembly area shall have accommodations for not less than two such persons.

8-4.5 Operating Features. (*See Chapter 31.*)

SECTION 8-5 BUILDING SERVICES

8-5.1 Utilities shall comply with the provisions of Section 7-1.

8-5.2 Heating, ventilating, and air conditioning equipment shall comply with the provisions of Section 7-2.

8-5.3 Elevators, dumbwaiters, and vertical conveyors shall comply with the provisions of Section 7-4.

8-5.4 Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 7-5.

CHAPTER 9 EXISTING ASSEMBLY OCCUPANCIES

(See also Chapter 31.)

SECTION 9-1 GENERAL REQUIREMENTS

9-1.1 Application.

9-1.1.1 The requirements of this chapter apply to existing assembly occupancies. *(See 9-1.3 for definition.)*

Exception: An existing building housing an assembly occupancy established prior to the effective date of this Code may have its use continued 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, explosions, and panic is provided and maintained.

9-1.1.2 Additions to existing buildings shall conform to the requirements for new construction. Existing portions of the structure need not be modified provided that the new construction has not diminished the fire safety features of the facility.

Exception: Existing portions must be upgraded if the addition results in a change of assembly classification.

9-1.1.3 An assembly occupancy which has its occupant load increased which results in a change of assembly classification shall meet the requirements for new assembly occupancies.

9-1.2 Mixed Occupancies. *(See also 1-4.7.)*

9-1.2.1* 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 so located, separated, or protected as to avoid any undue danger to the occupants of the assembly occupancy from a fire originating in the other occupancy or smoke therefrom.

9-1.2.2 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 classed as part of the other occupancy and subject to the provisions applicable thereto.

9-1.2.3 Assembly occupancies in buildings of other occupancy may 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*.

9-1.2.4 Exits shall be sufficient for simultaneous occupancy of both the assembly occupancy and other parts of the building.

Exception: Where the authority having jurisdiction determines that the conditions are such that simultaneous occupancy will not occur.*

9-1.3 Special Definitions.

Assembly Occupancies. Include, but are not limited to, all buildings or portions of buildings used for gathering together 50 or more persons for such purpose as deliberation, worship, entertainment, dining, amusement, or awaiting transportation.

Fly. The space over the stage of a theater where scenery and equipment can be hung out of view. Also called lofts and rigging lofts.

Fly Gallery. A narrow raised platform at the side of a legitimate stage from which the lines for flying scenery are manipulated.

Gridiron. The arrangement of beams over a legitimate stage supporting the machinery for flying scenery and hanging battens from which lighting is hung.

Nightclub. An establishment primarily engaged in the retail sale of beverages, which provides entertainment and where any service of food is incidental to the entertainment. Such establishments include, but are not limited to, cabarets, discotheques, beer gardens, show rooms and like establishments.

Pinrail. A beam at one side of a legitimate stage through which wooden or metal pins are driven and to which lines from the flies are fastened.

Platform.* That raised area within a building used for the presentation of music, plays or other entertainment; the head table for special guests; the raised area for lectures and speakers; boxing and wrestling rings; theater-in-the-round; and similar purposes wherein there are no overhead hanging curtains, drops, scenery or stage effects other than lighting.

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

Platform, Permanent. A platform erected within an area for more than 30 days.

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

Restaurant. A food or a food and beverage establishment which may or may not provide entertainment and where the entertainment is incidental to food and beverage service.

Stage. A partially enclosed area within a building used for the purpose of entertainment and shall be classified as either:

(a) *Stage, Legitimate.* A stage wherein curtains, drops, leg drops, scenery, lighting devices or other stage effects are retractable horizontally or suspended overhead.

(b) *Stage, Regular.* A stage wherein curtains, fixed leg drops, valances, scenery and other stage effects are hung and are not usually retractable.

(c) *Stage, Thrust.* A platform extending beyond the proscenium arch and into the audience.

(d) *Stage, Temporary.* A stage erected for a period of not more than 30 days.

9-1.4 Classification of Occupancy. *(See 4-1.2.)*

9-1.4.1 Classification of Assembly Occupancies. Each assembly occupancy shall be classified according to its occupant

load, as follows: Class A, occupant load greater than 1000 persons; Class B, occupant load greater than 300 but not greater than 1000 persons; Class C, occupant load greater than 50 but not greater than 300 persons.

9-1.5 Classification of Hazard of Contents. Contents of assembly occupancies shall be classified in accordance with the provisions of Section 4-2.

9-1.6 Minimum Construction Requirements (*see 6-2.1*). The location of an assembly occupancy shall be limited as follows:

Type of Construction	Below LED	LED	Number of Levels Above LED 1	2	3	4 & Above
I (443), I (332), II (222)	A†B†C† Any Number of Levels	ABC	ABC	ABC	ABC	A†BC
II (111)	A†B†C† One Level Below LED	ABC	ABC	A†BC	B†C†	N.P.
III (211), IV (2HH), V (111)	A†B†C† One Level Below LED	ABC	ABC	A†B†C	B†C†	N.P.
II (000)	B†C† One Level Below LED	A†BC	C†	N.P.	N.P.	N.P.
III (200), V (000)	B†C† One Level Below LED	A†BC	C†	N.P.	N.P.	N.P.

†Permitted if the level of the assembly occupancy and any story intervening between that level and the level of exit discharge are protected throughout by an approved automatic sprinkler system. If there are any openings between the level of exit discharge and the exits serving the place of assembly, the level of exit discharge shall also be protected throughout by an approved automatic sprinkler system (*see Section 7-7*).
N.P. — Not Permitted
LED — Level of Exit Discharge

9-1.7 Occupant Load.

9-1.7.1 The occupant load permitted in any assembly building, structure, or portion thereof shall be determined by dividing the net floor area or space assigned to that use by the square foot (square meter) per occupant as follows:

(a) An assembly area of concentrated use without fixed seats such as an auditorium, church, chapel, dance floor, discotheque or lodge room — 7 sq ft (.65 sq m) per person.

(b) An assembly area of less concentrated use such as a conference room, dining room, drinking establishment, exhibit room, gymnasium, or lounge — 15 sq ft (1.4 sq m) per person.

(c) Bleachers, pews, and similar bench-type seating — 18 linear in. (45.7 linear cm) per person.

(d) Fixed Seating. The occupant load of an area having fixed seats shall be determined by the number of fixed seats installed. Required aisle space serving the fixed seats shall not be used to increase the occupant load.

(e) Libraries. In stack areas — 100 sq ft (9.3 sq m) per person; in reading rooms — 50 sq ft (4.6 sq m) per person.

Exception: The authority having jurisdiction may permit occupancy by number of persons not to exceed that for which the existing means of egress are adequate, provided that measures are established to prevent occupancy by any greater number of persons than permitted by room area or by fixed seating.

9-1.7.2 The occupant load permitted in a building or portion thereof may be increased above that specified in 9-1.7.1 if the necessary aisles and exits are provided but shall not exceed a density of 1 person per 5 sq ft (.46 sq m). To increase the occupant load, a diagram indicating placement of equipment, aisles, exits, and seating shall be provided to and approved by the authority having jurisdiction prior to any increase in occupant load.

9-1.7.3 Waiting Spaces. In theaters and other assembly occupancies where persons are admitted to the building at times when seats are not available to them, or when the permitted occupant load has been reached based on 9-1.7.1 or 9-1.7.2, and are allowed to wait in a lobby or similar space until seats or space are available, such use of lobby or similar space shall not encroach upon the required clear width of exits. Such waiting shall be restricted to areas other than the required means of egress. Exits shall be provided for such waiting spaces on the basis of one person for each 3 sq ft (0.28 sq m) 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.

SECTION 9-2 MEANS OF EGRESS REQUIREMENTS

9-2.1 General. All means of egress shall be in accordance with Chapter 5 and this chapter.

9-2.2* Types of Exits.

9-2.2.1 Exits of the specified number and width shall be of one or more of the following types, in accordance with the provisions of Chapter 5 of this *Code*:

(a) Doors (*see 5-2.1*)

(b) Revolving doors meeting the requirements for new construction (*see 5-2.1.10*)

(c) Stairs, Class A or Class B (*see 5-2.2*)

(d) Smokeproof enclosures (*see 5-2.3*)

(e) Horizontal exits (*see 5-2.4*)

(f) Ramps, Class A or Class B (*see 5-2.5*)

(g) Exit passageways (*see 5-2.6*)

(h) Escalators (*see 5-2.7*)

(i) Fire escape stairs (*see 5-2.8*).

9-2.2.2 Turnstiles. No turnstiles or other devices to restrict the movement of persons shall be installed in any assembly occupancy in such a manner as to interfere in any way with required means of egress facilities.

9-2.3 Capacity of Means of Egress.

9-2.3.1 The capacity of means of egress shall be in accordance with Section 5-3.

9-2.3.2 Main Exit. Every assembly occupancy shall be provided with a main exit. The main exit shall be of sufficient width to accommodate one-half of the total occupant load but shall be not less than the total required width of all aisles, exit passageways, and stairways leading thereto and shall be at the level of exit discharge or shall connect to a stairway or ramp leading to a street.

Exception No. 1: A bowling establishment shall have a main 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 such as stadiums, sports arenas, and passenger stations, exits may be distributed around the perimeter of the building provided the total exit width provides 116⅔ percent of the width needed to accommodate the permitted occupant load.

9-2.3.3 Other Exits. Each level of an assembly occupancy shall have access to the main exit and shall be provided with exits of sufficient width to accommodate two-thirds of the total occupant load served by that level. Such exits shall discharge in accordance with 9-2.7. Such exits shall be located as far apart as practicable and as far from the main exit as practicable. Such exits shall be accessible from a cross aisle or a side aisle (*see 9-2.3.2*).

Exception: Where only two exits are required, each exit shall be of sufficient width to accommodate not less than half the total occupant load.

9-2.4 Number of Exits.

9-2.4.1 Every Class A assembly occupancy shall have at least four separate means of egress as remote from each other as practicable.

9-2.4.2 Every Class B assembly occupancy shall have at least two separate means of egress as remote from each other as practicable and, if of a capacity of over 600, at least three separate means of egress, each not less than two exit units wide.

9-2.4.3* Every Class C assembly occupancy shall have at least two means of egress, consisting of separate exits or doors leading to a corridor or other spaces giving access to two separate and independent exits in different directions.

9-2.5 Arrangement of Means of Egress.

9-2.5.1 Exits shall be remote from each other and shall be arranged to minimize the possibility that they may be blocked by any emergency.

Exception: A common path of travel may be permitted for the first 20 ft (6.1 m) from any point.

9-2.5.2 Means of egress shall not be permitted through kitchens, storerooms, restrooms, closets, or hazardous areas as described in 9-3.2.

9-2.5.3 Seating.

(a) The spacing of rows of chairs shall provide a space of not less than 12 in. (30.5 cm) from the back of one chair to the front of the most forward projection of the chair immediately behind it. Horizontal measurements shall be made between vertical planes. When all chairs in a row have automatic or self-rising seats, the measurement may be made with seats in the up position. When any chair in the row does not have an automatic or self-rising seat, then the measurement shall be made with the seat in the down position.

(b) Rows of chairs between aisles shall have not more than 14 chairs.

(c) Rows of chairs opening onto an aisle at one end only shall have not more than seven chairs.

(d) Chairs without dividing arms shall have their capacity determined by allowing 18 in. (45.7 cm) per person.

(e) Where bleacher or grandstand seating without backs is used, indoors rows of seats shall be spaced not less than 22 in. (55.9 cm) nor more than 30 in. (76 cm) back to back. Vertical aisles shall be provided when such seating is more than eleven rows high. Vertical aisles, where provided, shall not have a dead end in excess of sixteen rows. The rise per row shall not exceed 12 in. (30.5 cm).

Exception: Folding or telescopic seating shall comply with NFPA 102, Standard for Assembly Seating, Tents, and Air-Supported Structures, with a limit of dead ends in vertical aisles of sixteen rows.

(f) Continental Seating.

1. With continental seating, the spacing of rows of unoccupied chairs shall provide a clear width between rows measured horizontally as follows (automatic or self-rising seats shall be measured in the seat-up position; other seats shall be measured in the seat-down position); 18-in. (45.7-cm) clear width between rows of 18 chairs or less; 20-in. (50.8-cm) clear width between rows of 35 chairs or less; 21-in. (53.3-cm) clear width between rows of 45 chairs or less; 22-in. (55.9-cm) clear width between rows of 46 chairs or more, and

2. There shall be not more than 100 chairs in a row between aisles at both sides of the seating areas, and

3. Exit doors shall be provided along each side aisle of the row of chairs at the rate of one pair of exit doors for each five rows of chairs. There shall be not more than five chair rows between pairs of doors. Such exit doors shall provide a minimum clear width of 66 in. (168 cm) discharging into a foyer, lobby, or to the exterior of the building.

9-2.5.4* Tablet-Arm Chair Seating. Tablet-arm chairs shall not be permitted where continental seating is used unless full compliance with row spacing requirements is provided when the table arm is in the usable position. Tablet-arm chairs which do not have a stored position for the tablet-arm shall not be permitted unless the required 12-in. (30.5-cm) clearance between rows of chairs is provided and maintained.

9-2.5.5 Aisles.

9-2.5.5.1 Every portion of any assembly building that contains chairs, tables, displays, equipment, or other materials shall be provided with aisles leading to exits in accordance with 9-2.5.5.2 through 9-2.5.5.5.

9-2.5.5.2 When serving more than 60 chairs, every aisle shall be not less than 3 ft (91 cm) wide when serving chairs on one side only, and not less than 3 ft 6 in. (107 cm) wide when serving chairs on both sides. Such minimum width shall be measured at the point farthest from an exit, cross aisle, or foyer and shall be increased in width by 1½ in. (3.8 cm) for each 5 ft (152 cm) in length toward the exit, cross aisle, or foyer. When

serving 60 seats or less, aisles shall be not less than 30 in. (76 cm) wide. On aisles where egress is possible in either direction, their width shall be uniform.

9-2.5.5.3 Aisles shall terminate in a cross aisle, foyer, or exit. The width of such cross aisle, foyer, or exit shall be not less than the sum of the required width of the widest aisle plus 50 percent of the total required width of the remaining aisles that it serves.

9-2.5.5.4 No dead-end aisle shall be greater than 20 ft (6.1 m) in length. In arena or thrust stage theaters, dead-end aisles at the stage shall not exceed five rows beyond a cross aisle.

9-2.5.5.5 With continental seating as set forth in 9-2.5.3(f), side aisles shall be not less than 44 in. (112 cm) in width.

9-2.5.5.6 Every portion of an assembly occupancy that contains table and chair-type seating facilities or tables, displays, equipment or other similar materials shall be provided with aisles leading to exits in accordance with 9-2.5.5.7 through 9-2.5.5.9.

9-2.5.5.7* Fixed or loose chairs, tables and similar furnishings or equipment shall be so arranged and maintained that a path of travel to an aisle or exit is provided. The path of travel shall not exceed 10 ft (3 m) from any point to an aisle or exit.

9-2.5.5.8* Rectangular banquet-type tables used for drinking or dining or purposes having similar seating configurations where the path of travel to an aisle exceeds 10 ft (3 m) shall be spaced not less than 54 in. (137 cm) apart where seating occurs back-to-back nor less than 36 in. (91 cm) where seating is on one side only. The path of travel to an aisle or exit shall not exceed 20 ft (6.1 m).

9-2.5.5.9* Width of Aisles. The width of aisles shall be sized in accordance with 5-3.2 and 9-2.3.1 but shall not be less than 36 in. (91 cm) in clear unobstructed width. When loose seating occurs bordering on the aisle, the 36-in. (91-cm) aisle is required plus an additional 19 in. (48.3 cm) for a chair on one side of the aisle or an additional 38 in. (97 cm) for chairs on both sides of the aisle.

9-2.5.5.10 Aisle Stairs and Ramps. Every aisle with a gradient 1 in 8 or less shall consist of a ramp. Every aisle with a gradient exceeding 1 in 8 shall consist of a stair having treads, risers, and handrails complying with the following requirements:

(a)* Tread depths shall be uniform in each aisle.

Exception No. 1 to (a): In aisle stairs where single intermediate treads are provided halfway between seating platforms such intermediate treads may have a relatively smaller but uniform depth but not less than 13 in. (33.0 cm).

Exception No. 2 to (a): Nonuniformities or tolerances shall not exceed 3/16 in. (0.5 cm) in adjacent treads.

(b)* Treads shall be a minimum of 11 in. (27.9 cm).

(c) Riser height shall be a minimum of 4 in. (10.2 cm).

(d) Riser height shall not exceed 8 in. (20.3 cm).

Exception No. 1 to (d): Where the gradient of an aisle exceeds 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 may exceed 8 in. (20.3 cm) but not exceed 11 in. (27.9 cm).

Exception No. 2 to (d): Folding or telescopic seating in accordance with NFPA 102, Standard for Assembly Seating, Tents, and Air-Supported Structures.

(e) Riser height shall be uniform within a flight.

Exception No. 1 to (e): Riser height may be nonuniform but only to the extent necessary by changes in gradient within a seating area to maintain necessary sight lines. Where nonuniformities exceed 3/16 in. (0.5 cm) between adjacent risers the exact location of such nonuniformities shall be indicated with a distinctive marking stripe on each tread at the nosing or leading edge adjacent to the nonuniform risers.

Exception No. 2 to (e): Nonuniformity or tolerances shall not exceed 3/16 in. (0.5 cm) in adjacent risers.

(f)* Aisle stairs shall be provided with handrails at one side or along the centerline complying with 5-2.2.6; however, such handrails may be discontinuous where they are provided along the centerline of such aisles. The gaps between adjacent sections of such discontinuous handrails shall not be less than 22 in. (55.9 cm) and not greater than 36 in. (91 cm) measured horizontally.

Exception to (f): Handrails may be omitted when risers do not exceed 7 in. (17.8 cm) in height.

(g)* A contrasting marking stripe shall be provided on each tread at the nosing or leading edge such that the location of such tread is readily apparent particularly when viewed in descent. Such stripe shall be at least 1 in. (2.5 cm) wide and not exceed 2 in. (5 cm) wide.

Exception to (g): The marking stripe may be omitted where tread surfaces and environmental conditions in all conditions of use are such that the location of each tread is readily apparent particularly when viewed in descent.

9-2.5.5.11 When 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 this section and shall constitute the only acceptable arrangement until revised or additional plans are submitted and approved.

Exception: Temporary deviations from the specifics of the approved plans shall be permitted provided the occupant load is not increased and the intent of this section is maintained.

9-2.6 Travel Distance to Exits. Exits shall be so arranged that the total length of travel from any point to reach an exit will not exceed 150 ft (45 m) in any assembly occupancy.

Exception: The travel distance may be increased to 200 ft (60 m) in assembly occupancies protected throughout by an approved automatic sprinkler system.

9-2.7 Discharge from Exits.

9-2.7.1 Exit discharge shall comply with Section 5-7.

9-2.7.2 A maximum of 50 percent of the exits may discharge through areas on the level of exit discharge in accordance with 5-7.2.

9-2.7.3 The level of exit discharge shall be measured at the point of principal entrance to the building.

9-2.7.4 Where the principal entrance to an assembly occupancy is via a depressed terrace, the terrace shall be at least as wide as the exit that it serves but not less than 5 ft (152 cm) wide, and it shall be increased in width by 50 percent of any other exits tributary thereto. The level of the terrace shall be considered the level of exit discharge for the purpose of 9-1.6 above.

9-2.8 Illumination of Means of Egress.

9-2.8.1 Illumination of means of egress in assembly occupancies shall be provided in accordance with Section 5-8.

9-2.8.2 In every auditorium or other assembly occupancy where pictures, motion pictures, or other projections are made by means of directed light, the illumination of the floors of exit access may be reduced during such period of projection to values of not less than 1/5 footcandle (2.2 lx).

9-2.9 Emergency Lighting. All assembly occupancies and their means of egress shall be provided with emergency lighting in accordance with Section 5-9.

Exception: Class C assembly occupancies, used exclusively for religious worship, shall not be required to have emergency lighting.

9-2.10 Marking of Means of Egress. Means of egress shall have signs in accordance with Section 5-10.

9-2.11 Special Features.

9-2.11.1 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 may be provided with a latch or lock only if it is panic hardware or fire exit hardware.

Exception No. 1: In assembly occupancies having an occupant load of not greater than 600 when the main exit consists of a single door or single pair of doors, locking devices in accordance with 5-2.1.5.1 Exception No. 2 may be used on the main exit. Any latching device on this door(s) shall be released by panic hardware.

Exception No. 2: Special locking arrangements complying with 5-2.1.6 are permitted on doors other than main exit doors.

9-2.11.2 Class C assembly occupancies in covered malls (*see 25-4.3.1 Exception*) may have horizontal or vertical security grilles or doors on the main entrance/exits in accordance with 5-2.1.4.1 Exception No. 3.

9-2.11.3 Railings.

(a) The fasciae of boxes, balconies, and galleries shall not be less than 26 in. (66 cm) high above the adjacent floor or have substantial railings not less than 26 in. (66 cm) high above the adjacent floor.

(b) 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.

(c) Cross aisles shall be provided with railings not less than 26 in. (66 cm) high above the adjacent floor.

Exception No. 1: Where the backs of seats on the front of the aisle project 24 in. (60 cm) or more above the adjacent floor of the aisle.

Exception No. 2: Existing railings 36 in. (91 cm) high at the ends of aisles where steps occur may continue to be used.

SECTION 9-3 PROTECTION

9-3.1 Protection of Vertical Openings. All interior stairways and other vertical openings shall be enclosed and protected as provided in Section 6-2.

Exception No. 1: Unprotected openings connecting not more than three floors may be permitted provided that they comply with 6-2.2.3.4.

Exception No. 2: Atriums in accordance with 6-2.2.3.5 are permitted.

Exception No. 3: Stairs may be open between balconies and main assembly floors in theaters, churches, or auditoriums where the travel distance is within the allowable limits (see 9-2.6).

Exception No. 4: Existing wood lath and plaster, existing ½-in. (1.3-cm) gypsum wallboard, existing installations of ¼-in. (.6-cm) thick wired glass that are, or are rendered, inoperative and fixed in the closed position, or other existing materials having similar fire-resistance capabilities shall be acceptable. All such assemblies shall be in good repair and free of any condition that would diminish their original fire resistance characteristics.

9-3.2 Protection from Hazards.

9-3.2.1 Stages and Platforms. (*See 9-1.3.*)

9-3.2.1.1 Vents. Regular and legitimate stages exceeding 500 sq ft (46.5 sq m) in floor area shall be provided with one or more vents constructed of noncombustible material. Ventilators shall be located near the center and above the highest part of the stage. They shall be raised above the stage roof and shall have a total ventilation area equal to at least 5 percent of the floor area of the stage.

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, must be protected against falling onto the stage. A wire screen, if used under the glass, must be so placed that, if clogged, it cannot reduce the required vent area or 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 which may be exerted by springs or counterweights. This minimum counterforce shall be exerted on each door through its entire arc of travel and for a minimum of 115 degrees. A manual control shall also be provided.

Springs, when employed to actuate 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 air stream nor exposed to the outside.

A fusible link shall be placed in the cable control system on the underside of the vents at or above the roof line or as approved by the authority having jurisdiction and shall be so located as not to be affected by the operation of a fire sprinkler system. Remote, manual or electrical controls shall provide for

both opening and closing of the vent doors for periodic testing and shall be located at a point on the stage designated by the authority having jurisdiction. When remote control vents are electrical, power failure shall not affect its instant operation in the event of fire. Hand winches may be employed to facilitate operation of manually controlled vents.

9-3.2.1.2 The proscenium opening of every stage shall be provided with a curtain constructed and mounted so as to intercept hot gases, flames, and smoke, and to prevent glow from a severe fire on the stage showing on the auditorium side within a 5-minute period. The curtain shall be automatic closing without the use of applied power.

Exception: In lieu of the protection required herein, all the following may be provided:

(a) A noncombustible opaque fabric curtain so arranged that it will close automatically, and

(b) An automatic fixed waterspray deluge system shall be located on the auditorium side of the proscenium opening and be so arranged 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, and

(c) The curtain shall be automatically operated in case of fire by a combination of rate-of-rise and fixed temperature detectors which also activate the deluge spray system. Stage sprinklers and vents shall be automatically operated in case of fire by fusible elements, and

(d) Operation of the stage sprinkler system or spray deluge valve shall automatically activate the emergency ventilating system and close the curtain, and

(e) The curtain, vents and spray deluge system valve shall also be capable of manual operation.

9-3.2.1.3 Fire Protection. Every stage (legitimate, regular or thrust) larger than 500 sq ft (46.5 sq m) in area shall have a system of automatic sprinklers at the ceiling, in usable spaces under the stage, in auxiliary spaces and dressing rooms, storerooms, and workshops. When there is a stage gridiron, 135°F (57°C) rated sidewall sprinklers with heat-baffle plates shall be installed around the perimeter of the stage, except above the proscenium opening, at points not more than 30 in. (76 cm) below the gridiron, and with sprinklers positioned 4 to 6 in. (10.2 to 15.2 cm) below the baffle plate.

9-3.2.1.4 Auxiliary stage spaces such as understage areas, dressing rooms, workshops, and similar spaces associated with the functioning of a stage shall comply with the following:

(a) No point within any auxiliary space shall be more than 50 ft (15 m) from a door providing access to an exit.

(b) There shall be at least two exits available from every auxiliary stage space, one of which shall be available within a travel distance of 75 ft (23 m). A common path of travel of 20 ft (6.1 m) shall be permitted.

(c) Auxiliary stage spaces shall be equipped with automatic sprinklers when required by 9-3.2.1.3.

(d) No workshop involving the use of a combustible or flammable paint, liquids, or gases, or their storage shall open directly upon a stage.

9-3.2.1.5 Where automatic sprinkler protection is not provided, the proscenium wall of every theater using movable scenery or decorations shall not have more than two openings entering the stage, exclusive of the proscenium opening. Such openings shall not exceed 21 sq ft (2.0 sq m) each and shall be fitted with self-closing fire doors.

9-3.2.1.6 Each legitimate or regular stage shall be equipped with a standpipe located on each side of the stage, equipped with a 2½-in. (6.4-cm) fire department connection, and a 1½-in. (3.8-cm) hose for occupant use, installed in accordance with 7-7.4.2.

9-3.2.2 Projection Booths.

9-3.2.2.1 Every place of assembly where an electric arc, Xenon, or other light source that generates hazardous gases, dust, or radiation is used shall have a projection room that complies with 9-3.2.2.2 from which the projection shall be made. 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.* (*See also Chapter 31.*)

9-3.2.2.2 Projection Rooms for Safety Film. Projection rooms for safety film shall meet the requirements of 9-3.2.2.3 through 9-3.2.2.8.

9-3.2.2.3 Every projection room shall be of permanent construction consistent with the construction requirements for the type of building in which the projection room is located. Openings need not be protected. The room shall have a floor area of not less than 80 sq ft (7.4 sq m) for a single machine and at least 40 sq ft (3.7 sq m) for each additional machine. Each motion picture projector, floodlight, spotlight, or similar piece of equipment shall have a clear working space not less than 30 in. (76 cm) on each side and at the rear thereof, but only one such space shall be required between adjacent projectors.

The projection room and the rooms appurtenant thereto shall have a ceiling height of not less than 7 ft 6 in. (229 cm).

9-3.2.2.4 Each projection room shall have at least one out-swinging, self-closing door not less than 2 ft 6 in. (76 cm) wide by 6 ft 8 in. (203 cm) high.

9-3.2.2.5 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.

9-3.2.2.6 Projection room ventilation shall be not less than the following:

(a) *Supply Air.* Each projection room shall be provided with two or more air supply inlets so arranged as to provide well-distributed air throughout the room. Such inlets shall have screened openings within 12 in. (30.5 cm) of the floor. Air inlet ducts shall provide an amount of air equivalent to the amount of air being exhausted by projection equipment. Air may be taken from the outside; from adjacent spaces within the building provided the volume and infiltration rate is sufficient; or from the building air conditioning system provided it is so arranged as to provide sufficient air when other systems are not in operation.

(b) *Exhaust Air.* Projection booths may be exhausted through the lamp exhaust system. The lamp exhaust system shall be positively interconnected with the lamp so that the lamp will not operate unless there is the air flow 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 may also serve appurtenant rooms such as the generator room and the rewind room.

9-3.2.2.7 Each projection machine shall be provided with an exhaust duct that will draw air from each lamp and exhaust it directly to the outside of the building. The lamp exhaust may serve to exhaust air from the projection room to provide room air circulation. Such ducts shall be of ridged materials, except for a flexible connector approved for the purpose. The lamp exhaust system shall not be interconnected with any other system.

(a) *Electric Arc Projection Equipment.* The exhaust capacity shall be 200 cfm (.09 cu m/s) for each lamp connected to the lamp exhaust system, or as recommended by the equipment manufacturer. Auxiliary air may 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 cfm (.14 cu m/s) per lamp, not less than that exhaust volume required or recommended by the equipment manufacturer, whichever is the greater.

9-3.2.2.8 Miscellaneous Equipment and Storage.

(a) Each projection room shall be provided with rewind and film storage facilities.

(b) A maximum of four containers for flammable liquids not greater than 16 oz (.5 L) capacity and of a nonbreakable type may be permitted in each projection booth.

(c) Appurtenant electrical equipment such as rheostats, transformers, and generators may be located within the booth or in a separate room of equivalent construction.

9-3.2.3 Service Equipment, Hazardous Operations or Processes, and Storage Facilities.

9-3.2.3.1 Rooms containing high pressure boilers, refrigerating machinery of other than domestic refrigerator type, large transformers, or other service equipment subject to possible explosion shall not be located directly under or adjacent to required exits. All such rooms shall be separated by a 1-hour fire barrier from other parts of the building.

9-3.2.3.2 Rooms or space for the storage, processing, or use of the materials specified in this section shall be protected in accordance with the following:

(a) Rooms or spaces used for the storage of combustible supplies in quantities deemed hazardous by the authority having jurisdiction, hazardous materials in quantities deemed hazardous by recognized standards, or fuel shall be separated from the remainder of the building by construction having not less than a 1-hour fire resistance rating with all openings protected by self-closing or smoke-actuated fire doors, or such rooms or spaces may be protected by an automatic extinguishing system as set forth in Section 6-4.

(b) Rooms or spaces used for processing or use of combustible supplies in quantities considered hazardous by the authority having jurisdiction, hazardous materials, or for flammable or combustible liquids in quantities deemed hazardous by recognized standards shall be separated from the remainder of the building by construction having not less than a 1-hour fire resistance rating with all openings protected by self-closing or smoke-actuated fire doors and shall also be protected by an automatic extinguishing system as set forth in Section 6-4.

(c) Boiler and furnace rooms, laundries, and maintenance shops, including woodworking and painting areas, shall be separated from the remainder of the building by construction having not less than a 1-hour fire resistance rating with all openings protected by self-closing or smoke-actuated fire doors or such rooms or spaces may be protected by an automatic extinguishing system as set forth in Section 6-4.

Exception to (c): Rooms enclosing air-handling equipment.

(d) When automatic extinguishing systems are used to meet the requirements of this section, the rooms or spaces shall be separated from the remainder of the building by a smoke barrier.

9-3.2.4 Special Provisions for Food Service Establishments.

9-3.2.4.1 All devices in connection with the preparation of food shall be so installed and operated as to avoid hazard to the safety of occupants.

9-3.2.4.2 All devices in connection with the preparation of food shall be of an approved type and shall be installed in an approved manner.

9-3.2.4.3 Food preparation facilities shall be protected in accordance with 7-2.3 and are not required to have openings protected between food preparation areas and dining areas.

9-3.3 Interior Finish.

9-3.3.1 The interior finish requirements of this section shall be in accordance with Section 6-5.

9-3.3.2 Interior finish in all corridors and lobbies shall be Class A or B and in enclosed stairways Class A.

9-3.3.3 Interior finish in general assembly areas of Class A or Class B assembly occupancies shall be Class A or Class B. In Class C assembly occupancies it shall be Class A, B, or C.

Exception: In any assembly occupancy, exposed portions of structural members complying with the requirements for Type IV (2HH) construction may be permitted.

9-3.3.4 Screens on which pictures are projected shall comply with requirements of Class A or Class B interior finish.

9-3.4 Detection, Alarm and Communications Systems.

9-3.4.1 General. Assembly occupancies required to be sprinklered by 9-3.5.1, theaters with more than one audience viewing room, and all assembly occupancies of over 2,000 occupant load shall be provided with an approved fire alarm system in accordance with this section.

Exception No. 1: Assembly occupancies which are part of another occupancy provided that the fire alarm requirements of that other occupancy are met.

Exception No. 2: Assembly occupancies where, in the judgment of the authority having jurisdiction, adequate alternative provisions exist or are provided for the discovery of a fire condition and for the prompt alerting of the occupants.

9-3.4.2* Initiation. Initiation of the required fire alarm system shall be by approved means, capable of transmitting an

alarm to a receiving station, located within the building, which is constantly attended when the assembly occupancy is occupied.

9-3.4.3 Notification.

9-3.4.3.1 The required fire alarm system shall sound an audible alarm in a constantly attended receiving station within the building for purposes of initiating emergency action.

9-3.4.3.2 Occupant notification shall be by means of either voice or prerecorded message announcement initiated by the person in the constantly attended receiving station.

9-3.4.3.3 The announcement shall be made via an approved voice communication or public address system, which is audible above the ambient noise level of the assembly occupancy.

9-3.4.3.4 Where the authority having jurisdiction determines that it is impractical to have a constantly attended location in an assembly occupancy other than a theater, a fire alarm system in accordance with Section 7-6 initiated by manual stations in accordance with 7-6.2.1(a) or other approved means of initiation, which automatically provides prerecorded evacuation instructions in accordance with 7-6.3.8, may be used.

9-3.5 Extinguishment Requirements. (*See 9-1.6, 9-2.6, and 9-3.2.*)

9-3.5.1 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 7-7 when the exhibition or display area exceeds 15,000 sq ft (1400 sq m).

SECTION 9-4 SPECIAL PROVISIONS

9-4.1 Windowless or subterranean buildings shall comply with this chapter and Section 30-7.

9-4.2 Outdoor Assembly.

9-4.2.1 All grandstands, tents, and other places of outdoor assembly shall comply with the requirements of NFPA 102, *Standard for Assembly Seating, Tents, Grandstands and Air-Supported Structures.*

9-4.3 Special Provisions for Exhibition Halls.

9-4.3.1 No display or exhibit shall be so installed or operated as to interfere in any way with access to any required exit or with visibility of any required exit or of any required exit sign, nor shall any display block access to fire fighting equipment.

9-4.3.2 All displays or exhibits of combustible material or construction and all booths and temporary construction in connection therewith shall be so limited in combustibility or protected as to avoid any undue hazard of fire that might endanger occupants before they have the opportunity to use available exits, as determined by the authority having jurisdiction.

9-4.3.3 A storage room having an enclosure with a smoke barrier having a fire resistance rating of 1 hour and protected by an automatic fire extinguishing system shall be provided for combustible materials not on display.

9-4.4 Operating Features. (*See Chapter 31.*)

SECTION 9-5 BUILDING SERVICES

9-5.1 Utilities shall comply with the provisions of Section 7-1.

9-5.2 Heating, ventilating, and air conditioning equipment shall comply with the provisions of Section 7-2.

9-5.3 Elevators, dumbwaiters, and vertical conveyors shall comply with the provisions of Section 7-4.

9-5.4 Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 7-5.

CHAPTER 10 NEW EDUCATIONAL OCCUPANCIES

(See also Chapter 31.)

SECTION 10-1 GENERAL REQUIREMENTS

10-1.1 Application.

10-1.1.1 The requirements of this chapter apply to new buildings.

10-1.1.2 Rooms normally occupied by preschool, kindergarten, or first-grade pupils shall not be located above or below the level of exit discharge. Rooms normally occupied by second-grade pupils shall not be located more than one story above the level of exit discharge.

10-1.1.3* Educational occupancies shall make provisions for the physically handicapped.

10-1.1.4 Educational occupancies housing classes over the twelfth grade need not comply with this chapter, but shall comply with the following requirements:

(a) Instructional Building — Business Occupancy

(b) Classrooms under 50 persons — Business Occupancy

(c) Classrooms 50 persons and over — Assembly Occupancy

(d) Laboratories, Instructional — Business Occupancy

(e) Laboratories, Non-Instructional — Industrial.

10-1.2 Mixed Occupancies. *(See also 10-1.4.)*

10-1.2.1 When other types of occupancy occur in the same building as an educational occupancy, the requirements of 1-4.7 of this *Code* shall be applicable.

Exception: As otherwise specified in this chapter.

10-1.2.2 Assembly and Educational. Spaces subject to assembly occupancy shall comply with Chapter 8, including Special Provisions for Assembly Occupancies in Buildings of Other Occupancy, which provides that where auditorium and gymnasium exits lead through corridors or stairways also serving as exits for other parts of the building, the exit capacity shall be sufficient to permit simultaneous exit from auditorium and classroom sections.

Exception: In the case of an assembly occupancy of a type suitable only for use of the school occupant load (and therefore not subject to simultaneous occupancy), the same exit capacity may serve both sections.

10-1.2.3 Dormitory and Classrooms. Any building used for both classroom and dormitory purposes shall comply with the applicable provisions of Chapter 16 in addition to complying with Chapter 10. Where classroom and dormitory sections are not subject to simultaneous occupancy, the same exit capacity may serve both sections.

10-1.3 Special Definitions.

Common Atmosphere. A common atmosphere exists between rooms, spaces or areas within a building, which are not separated by an approved smoke barrier.

Flexible Plan and Open Plan Educational Buildings. Includes every building or portion of a building designed for multiple teaching stations.

(a) Flexible plan buildings have movable corridor walls and movable partitions of full-height construction with doors leading from rooms to corridors.

(b) Open plan buildings have rooms and corridors delineated by use of tables, chairs, desks, bookcases, counters, low-height 5-ft (152-cm) partitions, or similar furnishings.

Interior Room. A room whose only means of egress is through an adjoining or intervening room which is not an exit.

Room. For the purposes of this chapter, a room is a space or area bounded by any obstructions to egress which at any time enclose more than 80 percent of the perimeter of the space or area. Openings of less than 3 ft (91 cm) clear width and less than 6 ft 8 in. (203 cm) high shall not be considered in computing the unobstructed perimeter.

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

Separate Means of Egress. A means of egress separated in such a manner from other required means of egress as to provide an atmospheric separation which precludes contamination of both means of egress by the same fire. *(See Section 6-3.)*

Smoke Barrier. *(See Section 6-3.)* For purposes of this chapter, smoke barriers shall also include floors and openings therein.

10-1.4 Classification of Occupancy. *(See 4-1.3.)*

10-1.4.1* Educational occupancies shall include all buildings used for educational purposes through the twelfth grade by six or more persons for 4 hours per day or more than 12 hours per week.

10-1.4.2 Educational occupancy includes part-day, nursery schools, kindergartens, and other schools whose purpose is primarily educational even though the children are of preschool age.

10-1.4.3 In cases where instruction is incidental to some other occupancy, the section of this *Code* governing such other occupancy shall apply.

10-1.4.4 Adult day-care shall include any building used for nonsleeping purposes for less than 24 hours per day to house one or more well, ambulatory or semi-ambulatory (nonbedridden) adults none of whom requires medical injections by staff personnel. For the purposes of this definition, adults shall include those who:

(a) May require the administration of dry or liquid oral medication by staff personnel when and as prescribed by a licensed medical practitioner, and

(b) May require limited attendance, supervision or observation, and

(c) Exhibit acceptable behavior (not harmful to self or others), and

(d) Are able to toilet self, and

(e) Are able to feed self, and

(f) Possess adequate mobility, and

(g) Are otherwise essentially homebound.

10-1.4.5 Other occupancies associated with educational institutions shall be in accordance with the appropriate parts of this *Code*. (*See Chapters 12, 16, 18, 20, 28, 29, and 30, and 1-4.7.*)

10-1.5 Classification of Hazard of Contents. Contents of educational occupancies shall be classified in accordance with the provisions of Section 4-2.

10-1.6* Minumum Construction Requirements. No Requirements.

10-1.7 Occupant Load.

10-1.7.1 The occupant load of educational buildings or any individual story or section thereof for the purpose of determining exits shall be as determined by the authority having jurisdiction but not less than one person for each 20 sq ft (1.9 sq m) of net classroom area or 50 sq ft (4.6 sq m) of net area of shops, laboratories, and similar vocational rooms. In day-care centers, the occupant load shall be not less than one person for each 35 sq ft (3.3 sq m) of net area.

10-1.7.2 The occupant load of an area having fixed seats shall be determined by the number of fixed seats installed. Required aisle space serving the fixed seats shall not be used to increase the occupant load.

10-1.7.3 The capacity of an educational occupancy or a portion thereof may be modified from that specified above 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.

10-1.7.4 The occupant load for determining exit requirements of individual lecture rooms, gymnasiums, or cafeterias used for assembly purposes of more than 50 persons shall be determined in accordance with 8-1.7 of this *Code*.

SECTION 10-2 MEANS OF EGRESS REQUIREMENTS

10-2.1 General. Means of egress shall be in accordance with Chapter 5 and this section.

10-2.2 Types of Exits. Exits of the specified number and width shall be one or more of the following types, in accordance with the provisions of Chapter 5 of this *Code*:

(a) Doors. (*See 5-2.1.*)

(b) Stairs. (*See 5-2.2.*)

(c) Smokeproof Enclosures. (*See 5-2.3.*)

(d) Horizontal Exits. (*See 5-2.4.*)

(e) Ramps — Class A or Class B. (*See 5-2.5.*)

(f) Exit Passageways. (*See 5-2.6.*)

10-2.3 Capacity of Means of Egress.

10-2.3.1 Capacity of means of egress shall be in accordance with Section 5-3.

10-2.3.2* The same exit units or fraction thereof required for any individual floor may be counted as simultaneously serving all floors above the first story or floor of exit discharge.

10-2.3.3 Minimum Corridor Width.

10-2.3.3.1 Exit access corridors shall be not less than 6 ft (183 cm) wide in the clear.

10-2.3.3.2 Drinking fountains or other equipment, fixed or movable, shall not be so placed as to obstruct the required minimum 6 ft (183 cm) corridor width.

10-2.4 Number of Exits.

10-2.4.1 There shall be at least two exits available from every floor area.

10-2.5 Arrangement of Means of Egress.

10-2.5.1* Exits shall be so arranged that at least two separate exits will be available from every floor area. Exits shall be as remote from each other as practicable, so arranged that there will be no pockets or dead ends of appreciable size in which occupants may be trapped, and in no case shall any dead-end corridor extend more than 20 ft (6.1 m) beyond the stairway of other means of exit therefrom.

10-2.5.2 Every room or space with a capacity of more than 50 persons or more than 1,000 sq ft (93 sq m) in area shall have at least two doorways as remote from each other as practicable. Such doorways shall provide access to separate exits, but, where egress is through corridors, may open upon a common corridor leading to separate exits in opposite directions.

10-2.5.3 Doors which swing into an exit access corridor shall be recessed to prevent interference with corridor traffic; any doors not so recessed shall open 180 degrees to stop against wall. Doors in any position shall not reduce the required corridor width by more than one half.

10-2.5.4 Aisles.

10-2.5.4.1 When there are more than 60 seats, every aisle shall be not less than 3 ft (91 cm) wide when serving seats on one side only and not less than 3 ft 6 in. (107 cm) when serving seats on both sides. When serving 60 seats or less, aisles shall not be less than 30 in. (76 cm) wide. The space between parallel rows of seats does not constitute an aisle. No more than six seats shall intervene between any seat and an aisle.

10-2.5.5 Exterior Corridors or Balconies.

10-2.5.5.1* Where exterior corridors or balconies are provided as means of egress, they shall open to the outside air except for railings or balustrades with stairs or level exits to grade not over the allowable travel distance apart, so located that an exit will be available in either direction from the door to any individual room or space, with dead ends not to exceed 20 ft (6.1 m). If balconies are enclosed by glass or in any other manner, they shall be treated as interior corridors.

10-2.5.5.2 The floors of balconies (exterior corridors) and stairs shall be solid, without openings, and shall comply with requirements for outside stairs as regards balustrades or railings, width and pitch of stairs, and other details, but are not required to be shielded from fire within the building by blank

walls, wired glass windows or the like where the stairs are located on the side of the balcony or corridor away from the building and are separated from the building by the full required width of the balcony or corridor. Regardless of other provisions, exterior balconies and stairs may be of the same type of construction as the building which they serve.

10-2.6 Travel Distance to Exits. Travel distance to an exit shall not exceed 150 ft (45 cm) from any point in a building.

Exception: The travel distance may be increased to 200 ft (60 m) in educational occupancies protected throughout by an approved automatic sprinkler system.

10-2.7 Discharge from Exits. Discharge from exits shall be arranged in accordance with Section 5-7. A maximum of 50 percent of the exits may discharge through the level of exit discharge in accordance with 5-7.2.

Exception: Every classroom or room used for educational purposes or student occupancy below the floor of exit discharge shall have access to at least one exit which leads directly to the exterior at level of discharge without entering the floor above.

10-2.8 Illumination of Means of Egress. All educational buildings shall have adequate exit illumination in accordance with Section 5-8.

10-2.9 Emergency Lighting. Emergency lighting in accordance with Section 5-9 shall be provided:

(a) In all interior stairs and corridors

(b) In all normally occupied spaces

Exception to (b):

1. Administrative areas.

2. General classrooms.*

3. Mechanical rooms and storage areas.

(c) In flexible and open plan buildings

(d) In all portions of buildings that are interior or windowless.

10-2.10 Marking of Means of Egress. Marking of means of egress shall be provided in accordance with Section 5-10.

Exception: Signs are not required in situations where location of exits is otherwise obvious and familiar to all occupants, such as in small elementary school buildings.

10-2.11 Special Features.

10-2.11.1 Door Closure. All exit doors designed to be kept normally closed shall conform with 5-2.1.8.

10-2.11.2 Only one locking or latching device shall be permitted on a door or a leaf of a pair of doors.

10-2.11.3 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 may be provided with a latch or lock only if it is panic hardware or fire exit hardware.

10-2.11.4 Special locking arrangements complying with 5-2.1.6 are permitted.

10-2.11.5* Windows for Rescue and Ventilation. Every room or space used for classroom or other educational purposes or normally subject to student occupancy shall have at least one outside window used for emergency rescue or ventilation. Such window shall be openable from the inside without the use of tools, and provide a clear opening of not less than 20 in. (50.8 cm) in width, 24 in. (60 cm) in height and 5.7 sq ft (.53 sq m) in area. 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.

Exception No. 1: In buildings protected throughout by an approved automatic sprinkler system in accordance with Section 7-7.

Exception No. 2: Where the room or space has a door leading directly to the outside of the building.

SECTION 10-3 PROTECTION

10-3.1 Protection of Vertical Openings.

10-3.1.1 Any vertical opening shall be enclosed and protected in accordance with Section 6-2.

Exception: Unprotected vertical openings connecting not more than three floors may be permitted in accordance with 6-2.2.3.4.

10-3.1.2 Stairs shall be enclosed in accordance with Section 6-2.

Exception: Stairway enclosure will not be required for a stairway serving only one adjacent floor except a basement and not connected with stairways serving other floors and not connected to corridors.

10-3.2 Protection from Hazards.

10-3.2.1 Rooms or spaces for the storage, processing, or use of the materials specified in this section shall be protected in accordance with the following:

(a) Rooms or spaces used for the storage of combustible supplies in quantities deemed hazardous by the authority having jurisdiction, hazardous materials in quantities deemed hazardous by recognized standards, or fuel shall be separated from the remainder of the building by construction having not less than a 1-hour fire resistance rating with all openings protected by self-closing or smoke-actuated fire doors, or such rooms or spaces may be protected by an automatic extinguishing system as set forth in Section 6-4.

(b) Rooms or spaces used for processing or use of combustible supplies in quantities considered hazardous by the authority having juridiction, hazardous materials, or for flammable or combustible liquids in quantities deemed hazardous by recognized standards shall be separated from the remainder of the building by construction having not less than a 1-hour fire resistance rating with all openings protected by self-closing or smoke-actuated fire doors and shall also be protected by an automatic extinguishing system as set forth in Section 6-4.

(c) Boiler and furnace rooms, laundries, and maintenance shops, including woodworking and painting areas, shall be separated from the remainder of the building by construction having not less than a 1-hour fire resistance rating with all openings protected by self-closing or smoke-actuated fire doors.

Exception to (c): Rooms enclosing air-handling equipment.

(d) When automatic extinguishing systems are used to meet the requirements of this section, the rooms or spaces shall be separated from the remainder of the building by a smoke barrier.

10-3.2.2 Food preparation facilities shall be protected in accordance with 7-2.3, and are not required to have openings protected between food preparation areas and dining areas.

10-3.2.3 Janitor closets shall be protected by an automatic sprinkler system which may be supplied by the domestic water supply system serving no more than six sprinklers and having a water supply sufficient to provide 0.15 gpm per sq ft (6.1 L/min/sq m) of floor area. Doors to janitor closets may have ventilating louvers.

10-3.2.4 Laboratories that use chemicals shall comply with NFPA 45, *Standard on Fire Protection for Laboratories Using Chemicals.*

10-3.2.5 Stages shall be protected in accordance with Chapter 8.

10-3.3 Interior Finish.

10-3.3.1 Interior finish, in accordance with Section 6-5, shall be as follows:

(a) Exits — Class A.

(b) Other than exits — Class A or B.

Exception to (b): Fixtures and low-height partitions not over 5 ft (152 cm) high may be Class C.

Exception: The exposed portions of structural members complying with the requirements for Type IV (2HH) construction may be permitted.*

10-3.3.2 Interior Floor Finish. No Requirements.

10-3.4 Detection, Alarm and Communications Systems.

10-3.4.1 General. Educational occupancies shall be provided with a fire alarm system in accordance with Section 7-6.

10-3.4.2 Initiation.

10-3.4.2.1 Initiation of the required fire alarm system shall be by manual means in accordance with 7-6.2.1(a).

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 pull stations may be omitted except in locations specifically designated by the authority having jurisdiction.

10-3.4.2.2 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 above.

10-3.4.3 Notification.

10-3.4.3.1 Occupant notification shall be by means of an audible alarm in accordance with 7-6.3.

10-3.4.3.2 When acceptable to the authority having jurisdiction, the fire alarm system may be used to designate class change provided that the fire alarm is distinctive in signal and overrides all other use.

10-3.5 Extinguishment Requirements.

10-3.5.1 Every portion of educational buildings below the floor of exit discharge shall be protected throughout by an approved automatic sprinkler system in accordance with Section 7-7.

10-3.6 Interior Corridors.

10-3.6.1 Every interior corridor, including corridors in flexible plan buildings, shall be of construction having not less than a 1-hour fire resistance rating. Such corridor walls shall extend from floor slab to floor slab. All openings shall be protected with doors, frames and hardware, including closers, that shall all have a fire protection rating of at least 20 minutes.

Exception No. 1: Such corridor protection shall not be required when all classrooms served by such corridors have at least one door directly to the outside or to an exterior balcony or corridor as in 10-2.5.5.

Exception No. 2: In buildings protected throughout by an approved supervised automatic sprinkler system complying with Section 7-7, with the exception of 7-7.2.3, corridor protection may be reduced to a ½-hour fire resistance rating and may terminate at a ceiling of concrete, plaster or gypsum board construction. In such walls, doors shall be 1¾-in. (4.4 cm) solid bonded wood core doors or equivalent. Door closers are not required.

Exception No. 3: When the corridor ceiling is constructed with materials which would have a 1-hour fire resistance rating when tested as a wall, the corridor may terminate at the corridor ceiling.

10-3.7 Subdivision of Building Spaces.

10-3.7.1 School buildings shall be subdivided into compartments by smoke barriers having a 1-hour fire resistance rating and complying with Section 6-3 when:

(a) The maximum area of a compartment, including the aggregate area of all floors having a common atmosphere, exceeds 30,000 sq ft (2800 sq m); or

(b) The length or width of the building exceeds 300 ft (91 m).

10-3.7.2 The maximum area of a smoke compartment shall not exceed 30,000 sq ft (2800 sq m) with no dimension exceeding 300 ft (91 m).

SECTION 10-4 SPECIAL PROVISIONS

10-4.1 Windowless or Subterranean Buildings.

10-4.1.1 Windowless or subterranean buildings shall comply with this chapter and Section 30-7.

10-4.1.2 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 contained in 10-4.1.3 through 10-4.1.6.

Exception No. 1: Areas within buildings used only for service to the building such as boiler/heater rooms, cable vaults, dead storage and the like.

Exception No. 2: Auditoriums without intervening occupiable levels complying with the requirements of Chapter 8.

10-4.1.3 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 6-3 and having a 1-hour fire resistance rating.

(a) Each smoke compartment shall have access to at least one exit without passing through the other required compartment. Any door connecting required compartments shall be tight-fitting, 1-hour fire doors, designed and installed to minimize passage of smoke and which will close and latch automatically upon detection of smoke.

(b) Each smoke compartment shall be provided with a mechanical means of moving people vertically, such as an elevator or escalator.

(c) Each smoke compartment shall have an independent air supply and exhaust system capable of smoke control or smoke exhaust functions and providing a minimum smoke exhaust rate of six air changes per hour.

(d) Each smoke compartment shall be provided with an automatic smoke detection system throughout. The system shall be designed such that the activation of any two detectors shall cause the smoke control system to operate and the building voice alarm to sound.

10-4.1.4 The building shall be provided with emergency lighting in accordance with Section 5-9.

10-4.1.5 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.*

10-4.1.6 The building shall be provided with an approved supervised voice alarm system in accordance with Section 7-6. The voice alarm system shall comply with 7-6.3.8. A prerecorded evacuation message shall be permitted.

10-4.2 Flexible Plan and Open Plan Buildings. Flexible plan and open plan buildings shall also comply with the provisions of Section 10-6.

10-4.3 Operating Features. (*See Chapter 31.*)

SECTION 10-5 BUILDING SERVICES

10-5.1 Utilities shall comply with the provisions of Section 7-1.

10-5.2 Heating, ventilating, and air conditioning equipment shall comply with the provisions of Section 7-2.

10-5.3 Elevators, dumbwaiters, and vertical conveyors shall comply with the provisions of Section 7-4.

10-5.4 Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 7-5.

SECTION 10-6 FLEXIBLE PLAN AND OPEN PLAN BUILDINGS

10-6.1 General Requirements.

10-6.1.1 Flexible and open plan buildings shall comply with Sections 10-1 through 10-5, except as modified by this section.

10-6.2 Means of Egress Requirements.

10-6.2.1 Arrangement of Means of Egress.

10-6.2.1.1 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, not more than two of them shall enter into the same atmosphere.

10-6.2.1.2 Exit access from interior rooms may pass through an adjoining or an intervening room, provided that the travel distances do not exceed those set forth in 10-2.6. Foyers and lobbies constructed as required for corridors shall not be construed as intervening rooms.

10-6.2.1.3 Where the only means of egress from an interior room or rooms is through an adjoining or intervening room, smoke detectors shall be installed in the area of the common atmosphere through which the means of egress must pass. The detectors shall actuate alarms audible in the interior room and shall be connected to the school fire alarm system.

Exception No. 1: Smoke detectors are not required where the aggregate occupant load is less than ten.

Exception No. 2: Interior rooms used exclusively for mechanical and public utility service to the buildings.

Exception No. 3: Where the building is protected throughout by an approved automatic sprinkler system in accordance with Section 7-7.

10-6.2.1.4 Flexible plan schools may have walls and partitions rearranged periodically, only after revised plans or diagrams have been approved by the authority having jurisdiction.

10-6.2.1.5 Open plan schools shall have furniture, fixtures, or low-height partitions so arranged that exits will be clearly visible and unobstructed, and exit paths are direct, not circuitous. If paths or corridors are established, they shall be at least as wide as required by 10-2.3.3.

SECTION 10-7 DAY-CARE CENTERS

10-7.1 General Requirements.

10-7.1.1 Application.

10-7.1.1.1* The requirements detailed in Section 10-7, Day-Care Centers (more than 12 clients), are based on the minimum staff-to-client ratios which follow:

Staff Ratio	Age
1:3	0 to 2
1:5	2 to 3
1:10	3 to 5
1:12	5 to 7
1:15	7 and over

10-7.1.1.2* This section establishes life safety requirements for day-care centers 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. The provisions of Sections 10-2 through 10-6 shall not apply to this section unless a specific requirement is referenced by this section.

10-7.1.1.3 Centers housing children 6 years of age and older shall conform to the requirements for educational occupancies, except as noted herein.

10-7.1.1.4 Where a facility houses more than one age group, the requirements for the younger shall apply, unless the area housing the younger is maintained as a separate fire area.

10-7.1.2 Mixed Occupancies.

(a) Where centers are located in a building containing mixed occupancies, the occupancies shall be separated by 1-hour fire barriers.

Exception to (a): In assembly occupancies used primarily for worship.

(b) Centers in Apartment Buildings.

1. If the two exit accesses from the center enter the same corridor as the 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. The smoke barrier shall be so located that there is an exit on each side of it.

2. The door in the smoke barrier shall be not less than 36 in. (91 cm) wide.

3. The door assembly in the smoke barrier shall have a fire protection rating of at least 20 minutes and shall be self-closing or automatic-closing in accordance with 5-2.1.8.

10-7.1.3 Special Definitions. (None.)

10-7.1.4 Classification of Occupancy. For the purposes of this section, clients are classified in age groups as follows: clients under 6 years of age, and clients 6 years of age and older.

10-7.1.5 Classification of Hazard of Contents. The contents shall be classified as ordinary hazard in accordance with Section 4-2.

10-7.1.6 Minimum Construction Requirements.

10-7.1.6.1 Centers shall not be located above the heights indicated for the types of construction given in Table 10-7.1.6.1. (*See 6-2.1.*)

10-7.1.6.2 Location. The story below the level of exit discharge may be used in buildings of any construction type other than Type II (000), Type III (200), and Type V (000). (*See 10-7.2.4.2.*)

10-7.1.7 Occupant Load. The occupant load for which means of egress shall be provided for any floor shall be the maximum number of persons intended to occupy that floor but not less than one person for each 35 sq ft (3.3 sq m) of net floor area used by the clients.

10-7.2 Means of Egress Requirements.

10-7.2.1 General. (None.)

10-7.2.2 Types of Exits. (*See 10-2.2.*)

10-7.2.2.1 Stairs. Exit stairs shall be enclosed in accordance with 10-3.1.2.

Exception: The Exception to 10-3.1.2 shall not apply when clients ages 0 through 5 years are on upper floors.

Table 10-7.1.6.1 Height and Construction Limits

Type of Construction	Age Group	Number of Stories (Stories are counted starting at floor of exit discharge) 1	2	3	4 and over
I (443), I (332), II (222)	0 thru 5	X	X	X	X
	6 and older	X	X	X	X
II (111), III (211), V (111)	0 thru 5	X	X†	N.P.	N.P.
	6 and older	X	X	X†	N.P.
IV (2HH)	0 thru 5	X	X†	N.P.	N.P.
	6 and older	X	X†	N.P.	N.P.
II (000)	0 thru 5	X	X†	N.P.	N.P.
	6 and older	X	X†	N.P.	N.P.
III (200), V (000)	0 thru 5	X†	X†	N.P.	N.P.
	6 and older	X	X†	N.P.	N.P.

X: Permitted construction type
N.P.: Not Permitted
X†: Permitted if entire building is protected throughout by an approved automatic sprinkler system.

10-7.2.2.2 Areas of Refuge. In buildings over five stories above ground level, areas of refuge shall be provided for occupants of day-care centers by horizontal exits.

10-7.2.3 Capacity of Means of Egress. (*See 10-2.3.*)

10-7.2.4 Number of Exits.

10-7.2.4.1 Each floor occupied by clients shall have not less than two remote exits in accordance with Chapter 5.

10-7.2.4.2 When the story below the level of exit discharge is used (*see 10-7.1.6.2*), the following conditions shall be met:

(a) For up to 30 clients, there shall be two remote exits. One exit shall discharge directly outside and the vertical travel to ground level shall not exceed 8 ft (244 cm).

(b) For over 30 clients, a minimum of two exits shall be provided directly outside with one of the two exiting at ground level.

Exception: The exit directly to ground level is not required if the exits are protected in accordance with 5-1.3 and either smoke detectors or automatic sprinklers are provided in that story and the level of discharge.

10-7.2.5 Arrangement of Means of Egress. (*When the story below the exit discharge is used, see also 10-7.2.4.2.*)

10-7.2.6 Travel Distance to Exits.

10-7.2.6.1 Travel distance shall be measured in accordance with Section 5-6.

10-7.2.6.2 Travel distance:

(a) Between any room door intended as exit access and an exit shall not exceed 100 ft (30 m);

(b) Between any point in a room and an exit shall not exceed 150 ft (45 m);

(c) Between any point in a sleeping room and an exit access door of that room shall not exceed 50 ft (15 m).

Exception: The travel distance in (a) and (b) above may be increased by 50 ft (15 m) in buildings protected throughout by an approved supervised automatic sprinkler system in accordance with Section 7-7.

10-7.2.7 Discharge from Exits. (*When the story below the exit discharge is used, see also 10-7.2.4.2.*) All such exits shall discharge directly to the outside.

10-7.2.8 Illumination of Means of Egress. Illumination of the means of egress shall be provided in accordance with Section 5-8.

10-7.2.9 Emergency Lighting. Emergency lighting shall be provided in accordance with 10-2.9.

10-7.2.10 Marking of Means of Egress. Marking of means of egress shall be provided in accordance with Section 5-10.

10-7.2.11 Special Features.

10-7.2.11.1* Every closet door latch shall be such that children can open the door from inside the closet.

10-7.2.11.2 Every bathroom door lock shall be designed to permit opening of the locked door from the outside in an emergency. The opening device shall be readily accessible to the staff.

10-7.3 Protection.

10-7.3.1 Protection of Vertical Openings. Any vertical opening shall be enclosed and protected in accordance with Section 6-2.

10-7.3.2 Protection from Hazards. Rooms or spaces for the storage, processing, or use of the materials specified in this section shall be protected in accordance with the following:

(a) Rooms or spaces used for the storage of combustible supplies in quantities deemed hazardous by the authority having jurisidiction, hazardous materials in quantities deemed hazardous by recognized standards, or fuel shall be separated from the remainder of the building by construction having not less than a 1-hour fire resistance rating with all openings protected by self-closing or smoke-actuated fire doors, or such rooms or spaces may be protected by an automatic extinguishing system as set forth in Section 6-4.

(b) Rooms or spaces used for processing or use of combustible supplies in quantities considered hazardous by the authority having jurisdiction, hazardous materials, or for flammable or combustible liquids in quantities deemed hazardous by recognized standards shall be separated from the remainder of the building by construction having not less than a 1-hour fire resistance rating with all openings protected by self-closing or smoke-actuated fire doors and shall also be protected by an automatic extinguishing system as set forth in Section 6-4.

(c) Boiler and furnace rooms, laundries, and maintenance shops, including woodworking and painting areas, shall be separated from the remainder of the building by construction having not less than a 1-hour fire resistance rating with all openings protected by self-closing or smoke-actuated fire doors.

Exception to (c): Rooms enclosing air-handling equipment.

(d) When automatic extinguishing systems are used to meet the requirements of this section, the rooms or spaces shall be separated from the remainder by a physical barrier of such construction so as to contain the heat or smoke generated by a fire to allow for ready extinguishing system activation.

Exception: Food preparation facilities protected in accordance with 7-2.3 are not 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 is not required if approved by the authority having jurisdiction.

10-7.3.3 Interior Finish.

10-7.3.3.1 Interior finish for all walls and ceilings shall be Class A or Class B in accordance with Section 6-5. Interior finish in stairways, corridors, and lobbies shall be Class A.

10-7.3.3.2 Floor coverings within corridors and exits shall be Class I or Class II in accordance with Section 6-5.

10-7.3.4 Detection, Alarm and Communications Systems.

10-7.3.4.1 General. Day-care centers shall be provided with a fire alarm system in accordance with Section 7-6.

Exception No. 1: Day-care centers housed in one room.

Exception No. 2: Day-care centers with a required staff of fewer than four persons based on 10-7.1.1.1.

10-7.3.4.2 Initiation. Initiation of the required fire alarm system shall be by manual means and by operation of any required smoke detectors (*see 10-7.3.4.5*).

10-7.3.4.3 Occupant Notification. Occupant notification shall be by means of an audible alarm in accordance with 7-6.3.

10-7.3.4.4 Emergency Forces Notification. Fire department notification shall be accomplished in accordance with 7-6.4.

Exception: Day-care centers with not more than 100 clients.

10-7.3.4.5 Detection. A smoke detection system shall be installed in accordance with Section 7-6 with placement of detectors in each story in front of doors to the stairways and at no greater than 30 ft (9.1 m) spacing in the corridors of all floors containing the center. Detectors shall also be installed in lounges, recreation areas and sleeping rooms in the center.

Exception No. 1: Centers housing clients 6 years of age or older, if no sleeping facilities are provided.

Exception No. 2: Centers housed in only one room.

10-7.3.5 Extinguishment Requirements.

10-7.3.5.1 Standpipes for fire department use shall be installed in all buildings of six stories or more housing day-care centers. (*See Section 7-7.*)

10-7.3.6 Corridors. Exit access corridors within day-care centers shall comply with 10-3.6.1. (*See 10-7.1.2.*)

10-7.4 Special Provisions. (None.)

10-7.5 Building Services.

10-7.5.1 Utilities.

10-7.5.1.1 Utilities shall comply with the provisions of Section 7-1.

10-7.5.1.2 Special protective covers for all electrical receptacles shall be installed in all areas occupied by children under 6 years of age.

10-7.5.2 Heating, ventilating, and air conditioning equipment shall be in accordance with Section 7-2.

10-7.5.3 Elevators, dumbwaiters, and vertical conveyors shall comply with the provisions of Section 7-4.

10-7.5.4 Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 7-5.

SECTION 10-8* GROUP DAY-CARE HOMES

10-8.1 General Requirements.

10-8.1.1 Application.

10-8.1.1.1* This section establishes life safety requirements for group day-care homes in which at least 7 but not more than 12 clients receive care, maintenance, and supervision by other than their relatives or legal guardian(s) for less than 24 hours per day (generally within a dwelling unit). The provisions of Sections 10-2 through 10-6 shall not apply to this section unless a specific requirement is referenced by this section.

10-8.1.2 Mixed Occupancies.

(a) When a group home is located in a building containing mixed occupancies, the occupancies shall be separated by 1-hour fire barriers.

Exception to (a): In assembly occupancies used primarily for worship.

(b) Homes in Apartment Buildings.

1. If the two exit accesses from the home enter the same corridor as the 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. The smoke barrier shall be so located that there is an exit on each side of it.

2. The door in the smoke barrier shall be not less than 36 in. (91 cm) wide.

3. The door assembly in the smoke barrier shall have a fire protection rating of at least 20 minutes and shall be self-closing or automatic-closing in accordance with 5-2.1.8.

10-8.1.3 Special Definitions. (None.)

10-8.1.4 Classification of Occupancy. No Requirements.

10-8.1.5 Classification of Hazard of Contents. The contents shall be classified as ordinary hazard in accordance with Section 4-2.

10-8.1.6* Minimum Construction Requirements. (None.)

10-8.1.7 Occupant Load. No Special Requirements.

10-8.2 Means of Egress Requirements.

10-8.2.1 General. (None.)

10-8.2.2 Types of Exits. (*See 10-8.2.4.*)

10-8.2.3 Capacity of Means of Egress. (*See 10-2.3.*)

10-8.2.4 Number of Exits.

10-8.2.4.1 Each floor occupied by clients shall have not less than two remote means of escape.

10-8.2.4.2 Where spaces on the floor above the floor of exit discharge are used for sleeping purposes by clients, at least one means of egress shall be an exit discharging directly to the outside. The second means of escape may be a window in accordance with 10-2.11.5.

10-8.2.4.3 Where clients are located on a story below the level of exit discharge (basement), at least one means of egress shall be an exit discharging directly to the outside and the vertical travel to ground level shall not exceed 8 ft (244 cm). The second means of escape may be a window in accordance with 10-2.11.5. No facility shall be located more than one story below the ground. Any stairway to the story above shall be cut off by a fire barrier containing a door of at least a 20-minute fire protection rating, equipped with a self-closing device.

10-8.2.5 Arrangement of Means of Egress. (*When a story above or below the exit discharge is used, see 10-8.2.4.*)

10-8.2.6 Travel Distance to Exits. (*See 10-2.6.*)

10-8.2.7 Discharge from Exits. (*When the story above or below the exit discharge is used, see 10-8.2.4.*)

10-8.2.8 Illumination of Means of Egress. Illumination of the means of egress shall be provided in accordance with Section 5-8.

10-8.2.9 Emergency Lighting. No Requirements.

10-8.2.10 Marking of Means of Egress. No Requirements.

10-8.2.11 Special Requirements.

10-8.2.11.1* Every closet door latch shall be such that children can open the door from the inside of the closet.

10-8.2.11.2 Every bathroom door lock shall be designed to permit opening of the locked door from outside in an emergency. The opening device shall be readily accessible to the staff.

10-8.3 Protection.

10-8.3.1 Protection of Vertical Openings. The doorway between the level of exit discharge and any floor below shall be equipped with a door assembly having a 20-minute fire protection rating. Where the floor above the floor 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.

10-8.3.2 Protection from Hazards. No Requirements.

10-8.3.3 Interior Finish.

10-8.3.3.1 The interior finish in exits shall be Class A or B in accordance with Section 6-5.

10-8.3.3.2 Interior finish in occupied spaces in the home shall be Class A, B or C, in accordance with Section 6-5.

10-8.3.4 Detection, Alarm and Communications Systems.

10-8.3.4.1 Within the group day-care home, smoke detectors shall be installed in accordance with 7-6.2.7.

Exception: Houses housing clients 6 years of age or older, if no sleeping facilities are provided.

10-8.3.4.2 When the group day-care home is located within a building of another occupancy, such as in apartment or office buildings, any corridors serving the group day-care home shall be provided with a smoke detection system in accordance with Section 7-6, with placement of detectors at no greater than 30 ft (9.1 m) spacing.

10-8.3.4.3 Alarm Systems. No Requirements.

10-8.4 Special Provisions. (None.)

10-8.5 Building Services.

10-8.5.1 Electrical Services.

10-8.5.1.1 Electrical wiring shall be installed in accordance with Section 7-1.

10-8.5.1.2 Special protective covers for electrical receptacles shall be installed in all areas occupied by children under 6 years of age.

10-8.5.2 Heating Equipment.

10-8.5.2.1 Any heaters in spaces occupied by children shall be separated from the space by partitions, screens, or other means.

10-8.5.2.2 If solid partitions are used to provide the separation required in 10-8.5.2.1, provision shall be made to assure adequate air for combustion and ventilation for the heating equipment.

SECTION 10-9* FAMILY DAY-CARE HOMES

10-9.1 General Requirements.

10-9.1.1 Application.

10-9.1.1.1* This section establishes life safety requirements for licensed family day-care homes in which fewer than 7 clients receive care, maintenance, and supervision by other than their relatives or legal guardian(s) for less than 24 hours per day (generally within a dwelling unit). The provisions of Sections 10-2 through 10-6 shall not apply to this section unless a specific requirement is referenced by this section.

10-9.1.2 Mixed Occupancies. Where family day-care homes are located in a building containing mixed occupancies, the occupancies shall be separated by 1-hour fire barriers.

Exception: In assembly occupancies used primarily for worship.

10-9.1.3 Special Definitions. (None.)

10-9.1.4 Classification of Occupancies. No Requirements.

10-9.1.5 Classification of Hazard of Contents. (Not specifically classified.)

10-9.1.6* Minimum Construction Requirements. (None.)

10-9.1.7 Occupant Load. No Special Requirements.

10-9.2 Means of Egress Requirements.

10-9.2.1 General. (None.)

10-9.2.2 Types of Exits. (*See 10-9.2.4.*)

10-9.2.3 Capacity of Means of Egress. (*See 10-2.3.*)

10-9.2.4 Number of Exits.

10-9.2.4.1 Every room used for sleeping, living, or dining purposes shall have at least two means of escape, at least 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 may be a window in accordance with 10-2.11.5. No room or space shall be occupied for living or sleeping purposes which is accessible only by a ladder, folding stairs, or through a trap door.

10-9.2.4.2 Where clients are located on a floor (basement) below the level of exit discharge, at least one means of egress shall be an exit discharging directly to the outside, and the vertical travel to ground level shall not exceed 8 ft (244 cm). The second means of escape may be a window in accordance with 10-2.11.5. No facility shall be located more than one story below the ground.

10-9.2.4.3 Stairs. Every stairway shall comply at least with the minimum requirements for stairs as described in 5-2.2 in respect to width, risers, and treads and shall be maintained free of items of storage.

10-9.2.5 Arrangement of Means of Egress. (*See 10-9.2.4.*)

10-9.2.6 Travel Distance to Exits. (*See 10-2.6.*)

10-9.2.7 Discharge from Exits. (*See 10-9.2.4.*)

10-9.2.8 Illumination of Means of Egress. Illumination of the means of egress shall be in accordance with Section 5-8.

10-9.2.9 Emergency Lighting. No Requirements.

10-9.2.10 Marking of Means of Egress. No Requirements.

10-9.2.11 Special Features.

10-9.2.11.1 Each door in a means of egress shall not be less than 28 in. (71 cm) wide.

10-9.2.11.2* Every closet door latch shall be such that children can open the door from inside the closet.

10-9.2.11.3 Every bathroom door lock shall be designed to permit the opening of the locked door from the outside in an emergency. The opening device shall be readily accessible to the staff.

10-9.3 Protection.

10-9.3.1 Protection of Vertical Openings. (No special provisions.)

10-9.3.2 Protection from Hazards. No Requirements.

10-9.3.3 Interior Finish.

10-9.3.3.1 The interior finish in corridors, stairways, lobbies and exits shall be Class A or B in accordance with Section 6-5.

10-9.3.3.2 Interior finish in occupied spaces in the home shall be Class A, B, or C, in accordance with Section 6-5.

10-9.3.4 Detection, Alarm and Communications Systems.

10-9.3.4.1 Within the family day-care home, smoke detectors shall be installed in accordance with 7-6.2.7.

Exception: Homes housing clients 6 years of age or older, if no sleeping facilities are provided.

10-9.3.4.2 When the family day-care home is located within a building of another occupancy such as in apartment or office buildings, any corridors serving the family day-care home shall be provided with a smoke detection system in accordance with Section 7-6, with placement of detectors at no greater than 30 ft (9.1 m) spacing.

10-9.3.4.3 Alarm Systems. No Requirements.

10-9.4 Special Provisions. No Requirements.

10-9.5 Building Services.

10-9.5.1 Electrical Services.

10-9.5.1.1 Electrical wiring shall be installed in accordance with Section 7-1.

10-9.5.1.2 Special protective covers for all electrical receptacles shall be installed in all areas occupied by children in homes for children under 6 years of age.

10-9.5.2 Heating Equipment.

10-9.5.2.1 Unvented fuel-fired room heaters shall not be permitted. Oil- and gas-fired room heaters shall be installed in accordance with Section 7-2. A guard shall be provided to protect the children from hot surfaces and open flames.

CHAPTER 11 EXISTING EDUCATIONAL OCCUPANCIES

(See also Chapter 31.)

SECTION 11-1 GENERAL REQUIREMENTS

11-1.1 Application.

11-1.1.1* The requirements of this chapter apply to existing buildings.

11-1.1.2 Rooms normally occupied by preschool, kindergarten, or first-grade pupils shall not be located above or below the level of exit discharge. Rooms normally occupied by second-grade pupils shall not be located more than one story above the level of exit discharge.

11-1.1.3 Educational occupancies housing classes over the twelfth grade need not comply with this chapter, but shall comply with the following requirements:

(a) Instructional Building — Business Occupancy

(b) Classrooms under 50 persons — Business Occupancy

(c) Classrooms 50 persons and over — Assembly Occupancy

(d) Laboratories, Instructional — Business Occupancy

(e) Laboratories, Non-Instructional — Industrial.

11-1.2 Mixed Occupancies. *(See also 11-1.4.)*

11-1.2.1 When other types of occupancy occur in the same building as an educational occupancy, the requirements of 1-4.7 of this *Code* shall be applicable.

Exception: As otherwise specified in this chapter.

11-1.2.2 Assembly and Educational. Spaces subject to assembly occupancy shall comply with Chapter 9 including Special Provisions for Assembly Occupancies in Buildings of Other Occupancy, which provides that where auditorium and gymnasium exits lead through corridors or stairways also serving as exits for other parts of the building, the exit capacity shall be sufficient to permit simultaneous exit from auditorium and classroom sections.

Exception: In the case of an assembly occupancy of a type suitable only for use of the school occupant load (and therefore not subject to simultaneous occupancy), the same exit capacity may serve both sections.

11-1.2.3 Dormitory and Classrooms. Any building used for both classroom and dormitory purposes shall comply with the applicable provisions of Chapter 17 in addition to complying with Chapter 11. Where classroom and dormitory sections are not subject to simultaneous occupancy, the same exit capacity may serve both sections.

11-1.3 Special Definitions.

Common Atmosphere. A common atmosphere exists between rooms, spaces or areas within a building, which are not separated by an approved smoke barrier.

Flexible Plan and Open Plan Educational Buildings. Includes every building or portion of a building designed for multiple teaching stations.

(a) Flexible plan buildings have movable corridor walls and movable partitions of full-height construction with doors leading from rooms to corridors.

(b) Open plan buildings have rooms and corridors delineated by use of tables, chairs, desks, bookcases, counters, low-height 5-ft (152-cm) partitions, or similar furnishings.

Interior Room. A room whose only means of egress is through an adjoining or intervening room which is not an exit.

Room. For the purposes of this chapter, a room is a space or area bounded by any obstructions to egress which at any time enclose more than 80 percent of the perimeter of the space or area. Openings of less than 3 ft (91 cm) clear width and less than 6 ft 8 in. (203 cm) high shall not be considered in computing the unobstructed perimeter.

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

Separate Means of Egress. A means of egress separated in such a manner from other required means of egress as to provide an atmospheric separation which precludes contamination of both means of egress by the same fire. *(See Section 6-3.)*

Smoke Barrier. *(See Section 6-3.)* For purposes of this chapter, smoke barriers shall also include floors and openings therein.

11-1.4 Classification of Occupancy. *(See 4-1.3.)*

11-1.4.1* Educational occupancies shall include all buildings used for educational purposes through the twelfth grade by six or more persons for 4 hours per day or more than 12 hours per week.

11-1.4.2 Educational occupancy includes part-day, nursery schools, kindergartens, and other schools whose purpose is primarily educational even though the children are of preschool age.

11-1.4.3 In cases where instruction is incidental to some other occupancy, the section of this *Code* governing such other occupancy shall apply.

11-1.4.4 Adult day-care shall include any building used for nonsleeping purposes for less than 24 hours per day to house one or more well, ambulatory or semi-ambulatory (nonbedridden) adults, none of whom requires medical injections by staff personnel. For the purposes of this definition, adults shall include those who:

(a) May require the administration of dry or liquid oral medication by staff personnel when and as prescribed by a licensed medical practitioner, and

(b) May require limited attendance, supervision or observation, and

(c) Exhibit acceptable behavior (not harmful to self or others), and

(d) Are able to toilet self, and

(e) Are able to feed self, and

(f) Possess adequate mobility, and

(g) Are otherwise essentially homebound.

11-1.4.5 Other occupancies associated with educational institutions shall be in accordance with the appropriate parts of this *Code*. (*See Chapters 13, 17, 19, 20, 28, 29, and 30, and 1-4.7.*)

11-1.5 Classification of Hazard of Contents. Contents of educational occupancies shall be classified in accordance with the provisions of Section 4-2.

11-1.6 Minimum Construction Requirements. No Requirements.

11-1.7 Occupant Load.

11-1.7.1 The occupant load of educational buildings or any individual story or section thereof for the purpose of determining exits shall be as determined by the authority having jurisdiction but not less than one person for each 20 sq ft (1.9 sq m) of net classroom area or 50 sq ft (4.6 sq m) of net area of shops, laboratories, and similar vocational rooms. In day-care centers the occupant load shall be not less than one person for each 35 sq ft (3.3 sq m) of net area.

11-1.7.2 The occupant load of an area having fixed seats shall be determined by the number of fixed seats installed. Required aisle space serving the fixed seats shall not be used to increase the occupant load.

11-1.7.3 The capacity of an educational occupancy or a portion thereof may be modified from that specified above 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.

11-1.7.4 The occupant load for determining exit requirements of individual lecture rooms, gymnasiums, or cafeterias used for assembly purposes of more than 50 persons shall be determined in accordance with 9-1.7 of this *Code*.

SECTION 11-2 MEANS OF EGRESS REQUIREMENTS

11-2.1 General. Means of egress shall be in accordance with Chapter 5 and this section.

11-2.2 Types of Exits. Exits of the specified number and width shall be one or more of the following types, in accordance with the provisions of Chapter 5 of this *Code*:

(a) Doors. (*See 5-2.1.*)

(b) Stairs, Class A or Class B. (*See 5-2.2.*)

Exception to (b): Class B stairs shall not be used for student access.

(c) Smokeproof Enclosures. (*See 5-2.3.*)

(d) Horizontal Exits. (*See 5-2.4.*)

(e) Ramps — Class A or Class B. (*See 5-2.5.*)

(f) Exit Passageways. (*See 5-2.6.*)

11-2.3 Capacity of Means of Egress.

11-2.3.1 Capacity of means of egress shall be in accordance with Section 5-3.

11-2.3.2* The same exit units or fraction thereof required for any individual floor may be counted as simultaneously serving all floors above the first story or floor of exit discharge.

11-2.3.3 Minimum Corridor Width.

11-2.3.3.1 Exit access corridors shall be not less than 6 ft (183 cm) wide in the clear.

11-2.3.3.2 Drinking fountains or other equipment, fixed or movable, shall not be so placed as to obstruct the required minimum 6 ft (183 cm) corridor width.

11-2.4 Number of Exits.

11-2.4.1 There shall be at least two exits available from every floor area.

11-2.5 Arrangement of Means of Egress.

11-2.5.1* Exits shall be so arranged that at least two separate exits will be available from every floor area. Exits shall be as remote from each other as practicable, so arranged that there will be no pockets or dead ends of appreciable size in which occupants may be trapped, and in no case shall any dead-end corridor extend more than 20 ft (6.1 m) beyond the stairway or other means of exit therefrom.

11-2.5.2 Every room or space with a capacity of more than 50 persons or more than 1,000 sq ft (93 sq m) in area shall have at least two doorways as remote from each other as practicable. Such doorways shall provide access to separate exits, but, where egress is through corridors, may open upon a common corridor leading to separate exits in opposite directions.

11-2.5.3 Doors which swing into an exit access corridor shall be recessed to prevent interference with corridor traffic; any doors not so recessed shall open 180 degrees to stop against wall. Doors in any position shall not reduce the required corridor width by more than one-half.

11-2.5.4 Aisles.

11-2.5.4.1 When there are more than 60 seats, every aisle shall be not less than 3 ft (91 cm) wide when serving seats on one side only and not less than 3 ft 6 in. (107 cm) when serving seats on both sides. When serving 60 seats or less, aisles shall not be less than 30 in. (76 cm) wide. The space between parallel rows of seats does not constitute an aisle. No more than six seats shall intervene between any seat and an aisle.

11-2.5.5 Exterior Corridors or Balconies.

11-2.5.5.1* Where exterior corridors or balconies are provided as means of egress, they shall open to the outside air except for railings or balustrades with stairs or level exits to grade not over the allowable travel distance apart, so located that an exit will be available in either direction from the door to any individual room or space, with dead ends not to exceed 20 ft (6.1 m). If balconies are enclosed by glass or in any other manner, they shall be treated as interior corridors.

11-2.5.5.2 The floors of balconies (exterior corridors) and stairs shall be solid, without openings, and shall comply with requirements for outside stairs as regards balustrades or railings, width and pitch of stairs, and other details, but are not

required to be shielded from fire within the building by blank walls, wired glass windows or the like where the stairs are located on the side of the balcony or corridor away from the building and are separated from the building by the full required width of the balcony or corridor. Regardless of other provisions, exterior balconies and stairs may be of the same type of construction as the building which they serve.

11-2.6 Travel Distance to Exits. Travel distance to an exit shall not exceed 150 ft (45 m) from any point in a building.

Exception: The travel distance may be increased to 200 ft (60 m) in educational occupancies protected throughout by an approved automatic sprinkler system.

11-2.7 Discharge from Exits. Discharge from exits shall be arranged in accordance with Section 5-7. A maximum of 50 percent of the exits may discharge through the level of exit discharge in accordance with 5-7.2.

Exception: Every classroom or room used for educational purposes or student occupancy below the floor of exit discharge shall have access to at least one exit which leads directly to the exterior at level of discharge without entering the floor above.

11-2.8 Illumination of Means of Egress. All educational buildings shall have adequate exit illumination in accordance with Section 5-8.

11-2.9 Emergency Lighting. Emergency lighting in accordance with Section 5-9 shall be provided:

(a) In all interior stairs and corridors

(b) In all normally occupied spaces

Exception to (b):

1. Administrative areas.

2. General classrooms.*

3. Mechanical rooms and storage areas.

(c) In flexible and open plan buildings

(d) In all portions of buildings that are interior or windowless.

11-2.10 Marking of Means of Egress. Marking of means of egress shall be provided in accordance with Section 5-10.

Exception: Signs are not required in situations where location of exits is otherwise obvious and familiar to all occupants, such as in small elementary school buildings.

11-2.11 Special Features.

11-2.11.1 Door Closure. All exit doors designed to be kept normally closed shall conform with 5-2.1.8.

11-2.11.2 Only one locking or latching device shall be permitted on a door or a leaf of a pair of doors.

11-2.11.3 Panic Hardware or Fire Exit Hardware. Any required exit door subject to use by 100 or more persons may be provided with a latch or lock only if it is panic hardware or fire exit hardware.

11-2.11.4 Special locking arrangements complying with 5-2.1.6 are permitted.

11-2.11.5* Windows for Rescue and Ventilation. Every room or space used for classroom or other educational purposes or normally subject to student occupancy shall have at least one outside window used for emergency rescue or ventilation. Such window shall be openable from the inside without the use of tools, and provide a clear opening of not less than 20 in. (50.8 cm) in width, 24 in. (60 cm) in height and 5.7 sq ft (.53 sq m) in area. The bottom of the opening shall be not more than 44 in. (112 cm) above the floor.

Exception No. 1: In buildings protected throughout by an approved automatic sprinkler system in accordance with Section 7-7.

Exception No. 2: Where the room or space has a door leading directly to the outside of the building.

SECTION 11-3 PROTECTION

11-3.1 Protection of Vertical Openings.

11-3.1.1 Any vertical opening shall be enclosed and protected in accordance with Section 6-2.

Exception: Unprotected vertical openings connecting not more than three floors may be permitted in accordance with 6-2.2.3.4.

11-3.1.2 Stairs shall be enclosed in accordance with Section 6-2.

Exception: Stairway enclosure will not be required for a stairway serving only one adjacent floor except a basement. Such stairway shall not be connected with stairways serving other floors nor with corridors serving other than the two floors involved.

11-3.2 Protection from Hazards.

11-3.2.1 Rooms or spaces used for the storage, processing, or use of the materials specified in this section shall be protected in accordance with the following:

(a) Rooms or spaces used for the storage of combustible supplies in quantities deemed hazardous by the authority having jurisdiction, hazardous materials in quantities deemed hazardous by recognized standards, or fuel shall be separated from the remainder of the building by construction having not less than a 1-hour fire resistance rating with all openings protected by self-closing or smoke-actuated fire doors, or such rooms or spaces may be protected by an automatic extinguishing system as set forth in Section 6-4.

(b) Rooms or spaces used for processing or use of combustible supplies in quantities considered hazardous by the authority having jurisdiction, hazardous materials, or for flammable or combustible liquids in quantities deemed hazardous by recognized standards shall be separated from the remainder of the building by construction having not less than a 1-hour fire resistance rating with all openings protected by self-closing or smoke-actuated fire doors and shall also be protected by an automatic extinguishing system as set forth in Section 6-4.

(c) Boiler and furnace rooms, laundries, and maintenance shops, including wood-working and painting areas, shall be separated from the remainder of the building by construction having not less than a 1-hour fire resistance rating with all openings protected by self-closing or smoke-actuated fire doors, or such areas may be protected throughout by an

approved automatic sprinkler system in accordance with Section 7-7.

Exception to (c): Rooms enclosing air-handling equipment.

(d) When automatic extinguishing systems are used to meet the requirements of this section, the rooms or spaces shall be separated from the remainder of the building by a smoke barrier.

11-3.2.2 Food preparation facilities shall be protected in accordance with 7-2.3, and are not required to have openings protected between food preparation areas and dining areas.

11-3.2.3 Janitor closets shall be protected by an automatic sprinkler system, which may be supplied by the domestic water supply system serving no more than six sprinklers and having a water supply sufficient to provide 0.15 gpm per sq ft (6.1 L/min/sq m) of floor area. Doors to janitor closets may have ventilating louvers.

11-3.2.4 Laboratories that use chemicals shall comply with NFPA 45, *Standard on Fire Protection for Laboratories Using Chemicals.*

11-3.2.5 Stages shall be protected in accordance with Chapter 9.

11-3.3 Interior Finish.

11-3.3.1 Interior finish, in accordance with Section 6-5, shall be as follows:

(a) Exits — Class A

(b) Other than exits — Class A or B.

Exception to (b): Fixtures and low-height partitions not over 5 ft (152 cm) high may be Class C.

Exception: The exposed portions of structural members complying with the requirements for Type IV (2HH) construction may be permitted.*

11-3.3.2 Interior Floor Finish. No Requirements.

11-3.4 Detection, Alarm and Communications Systems.

11-3.4.1 General. Educational occupancies shall be provided with a fire alarm system in accordance with Section 7-6.

11-3.4.2 Initiation.

11-3.4.2.1 Initiation of the required fire alarm system shall be by manual means in accordance with 7-6.2.1(a).

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 pull stations may be omitted except in locations specifically designated by the authority having jurisdiction.

11-3.4.2.2 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 above.

11-3.4.3 Notification.

11-3.4.3.1 Occupant notification shall be by means of an audible alarm in accordance with 7-6.3.

11-3.4.3.2 When acceptable to the authority having jurisdiction, the fire alarm system may be used to designate class change provided that the fire alarm is distinctive in signal and overrides all other use.

11-3.5 Extinguishment Requirements.

11-3.5.1 Whenever student occupancy occurs below the floor of exit discharge, every portion of such floor shall be protected throughout by an approved automatic sprinkler system in accordance with Section 7-7. When student occupancy does not occur on floors below the floor 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 7-7.

11-3.6 Interior Corridors.

11-3.6.1 Every interior corridor, including corridors in flexible plan buildings, shall be of construction having not less than a 1-hour fire resistance rating, and all openings shall be protected with doors, frames and hardware, including closers, that shall all have a fire protection rating of at least 20 minutes.

Exception No. 1: Such corridor protection shall not be required when all classrooms served by such corridors have at least one door directly to the outside or to an exterior balcony or corridor as in 11-2.5.5.

Exception No. 2: When permitted by the authority having jurisdiction, the corridor may be separated from all other areas by non-rated partitions, when the building is protected throughout by an approved automatic sprinkler system with valve supervision.

Exception No. 3: Existing doors may be 1¾-in. (4.4-cm) solid bonded wood core doors or the equivalent.

11-3.7 Subdivision of Building Spacers.

11-3.7.1 School buildings shall be subdivided into compartments by smoke barriers complying with Section 6-3 when:

(a) The maximum area of a compartment, including the aggregate area of all floors having a common atmosphere, exceeds 30,000 sq ft (2800 sq m); or

(b) When the length or width of the building exceeds 300 ft (91 m).

Exception No. 1: Where all classrooms have exterior exit access in accordance with 5-5.3.

Exception No. 2: Buildings protected throughout by an approved automatic sprinkler system in accordance with Section 7-7.

11-3.7.2 The maximum area of a smoke compartment shall not exceed 30,000 sq ft (2800 sq m) with no dimension exceeding 300 ft (91 m).

SECTION 11-4 SPECIAL PROVISIONS

11-4.1 Windowless or Subterranean Buildings. Automatic sprinklers shall be provided for stories which are in excess of 1500 sq ft (140 sq m) and are:

(a) Without windows or other openings directly to the

exterior at the rate of 20 sq ft (1.86 sq m) of opening per 50 linear ft (15 m) in any two walls, or

(b) Below grade without similar openings.

11-4.2 Flexible Plan and Open Plan Buildings. Flexible plan and open plan buildings shall also comply with the provisions of Section 11-6.

11-4.3 Operating Features. (*See Chapter 31.*)

SECTION 11-5 BUILDING SERVICES

11-5.1 Utilities shall comply with the provisions of Section 7-1.

11-5.2 Heating, ventilating, and air conditioning equipment shall comply with the provisions of Section 7-2.

11-5.3 Elevators, dumbwaiters, and vertical conveyors shall comply with the provisions of Section 7-4.

11-5.4 Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 7-5.

SECTION 11-6 FLEXIBLE PLAN AND OPEN PLAN BUILDINGS

11-6.1 General Requirements.

11-6.1.1 Flexible and open plan buildings shall comply with Sections 11-1 through 11-5, except as modified by this section.

11-6.2 Means of Egress Requirements.

11-6.2.1 Arrangement of Means of Egress.

11-6.2.1.1 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, not more than two of them shall enter into the same atmosphere.

11-6.2.1.2 Exit access from interior rooms may pass through an adjoining or an intervening room, provided that the travel distances do not exceed those set forth in 11-2.6. Foyers and lobbies constructed as required for corridors shall not be construed as intervening rooms.

11-6.2.1.3 Where the only means of egress from an interior room or rooms is through an adjoining or intervening room, smoke detectors shall be installed in the area of the common atmosphere through which the means of egress must pass. The detectors shall actuate alarms audible in the interior room and shall be connected to the school fire alarm system.

Exception No. 1: Smoke detectors are not required where the aggregate occupant load is less than ten.

Exception No. 2: Interior rooms used exclusively for mechanical and public utility service to the buildings.

Exception No. 3: Where the building is protected throughout by an approved automatic sprinkler system in accordance with Section 7-7.

11-6.2.1.4 Flexible plan schools may have walls and partitions rearranged periodically, only after revised plans or diagrams have been approved by the authority having jurisdiction.

11-6.2.1.5 Open plan schools shall have furniture, fixtures, or low-height partitions so arranged that exits will be clearly visible and unobstructed, and exit paths are direct, not circuitous. If paths or corridors are established, they shall be at least as wide as required by 11-2.3.3.

SECTION 11-7 DAY-CARE CENTERS

11-7.1 General Requirements.

11-7.1.1 Application.

11-7.1.1.1* The requirements detailed in Section 11-7, Day-Care Centers (more than 12 clients), are based on the minimum staff-to-client ratios which follow:

Staff Ratio	Age
1:3	0 to 2
1:5	2 to 3
1:10	3 to 5
1:12	5 to 7
1:15	7 and over

11-7.1.1.2* This section establishes life safety requirements for day-care centers 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. The provisions of Sections 11-2 through 11-6 shall not apply to this section unless a specific requirement is referenced by this section.

11-7.1.1.3 Centers housing children 6 years of age and older shall conform to the requirements for educational occupancies, except as noted herein.

11-7.1.1.4 Where a facility houses more than one age group, the requirements for the younger shall apply, unless the area housing the younger is maintained as a separate fire area.

11-7.1.2 Mixed Occupancies.

(a) Where centers are located in a building containing mixed occupancies, the occupancies shall be separated by 1-hour fire barriers.

Exception to (a): In assembly occupancies used primarily for worship.

(b) Centers in Apartment Buildings.

1. If the two exit accesses from the center enter the same corridor as the 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. The smoke barrier shall be so located that there is an exit on each side of it.

2. The door in the smoke barrier shall be not less than 36 in. (91 cm) wide.

Exception to (b)2: Existing doors not less than 32 in. (81 cm) wide may be accepted.

3. The door assembly in the smoke barrier shall have a fire protection rating of at least 20 minutes and shall be self-closing or automatic-closing in accordance with 5-2.1.8.

11-7.1.3 Special Definitions. (None.)

11-7.1.4 Classification of Occupancy. For the purposes of this section, clients are classified in age groups as follows: clients under 6 years of age, and clients 6 years of age and older.

11-7.1.5 Classification of Hazard of Contents. The contents shall be classified as ordinary hazard in accordance with Section 4-2.

11-7.1.6 Minimum Construction Requirements.

11-7.1.6.1 Centers shall not be located above the heights indicated for the types of construction given in Table 11-7.1.6.1. (*See 6-2.1.*)

Table 11-7.1.6.1 Height and Construction Limits

Type of Construction	Age Group	Number of Stories (Stories are counted starting at floor of exit discharge) 1	2	3	4 and over
I (443), I (332), II (222)	0 thru 5	X	X	X	X
	6 and older	X	X	X	X
II (111), III (211), V (111)	0 thru 5	X	X†	N.P.	N.P.
	6 and older	X	X	X†	N.P.
IV (2HH)	0 thru 5	X	X†	N.P.	N.P.
	6 and older	X	X†	N.P.	N.P.
II (000)	0 thru 5	X	X†	N.P.	N.P.
	6 and older	X	X†	N.P.	N.P.
III (200), V (000)	0 thru 5	X†	X†	N.P.	N.P.
	6 and older	X	X†	N.P.	N.P.

X: Permitted construction type
N.P.: Not Permitted
X†: Permitted if entire building is protected throughout by an approved automatic sprinkler system.

11-7.1.6.2 Location. The story below the level of exit discharge may be used in buildings of any construction type other than Type II (000), Type III (200), and Type V (000). (*See 11-7.2.4.2.*)

11-7.1.7 Occupant Load. The occupant load for which means of egress shall be provided for any floor shall be the maximum number of persons intended to occupy that floor but not less than one person for each 35 sq ft (3.3 sq m) of net floor area used by the clients.

11-7.2 Means of Egress Requirements.

11-7.2.1 General. (None.)

11-7.2.2 Types of Exits. (*See 11-2.2.*)

11-7.2.2.1 Stairs. Exit stairs shall be enclosed in accordance with 11-3.1.2.

Exception: The Exception to 11-3.1.2 shall not apply when clients ages 0 through 5 years are on upper floors.

11-7.2.2.2 Areas of Refuge. In buildings over five stories above ground level, areas of refuge shall be provided for occupants of day-care centers either by smokeproof enclosures or horizontal exits.

11-7.2.3 Capacity of Means of Egress. (*See 11-2.3.*)

11-7.2.4 Number of Exits.

11-7.2.4.1 Each floor occupied by clients shall have not less than two remote exits in accordance with Chapter 5.

11-7.2.4.2 When the story below the level of exit discharge is used (*see 11-7.1.6.2*), the following conditions shall be met:

(a) For up to 30 clients, there shall be two remote exits. One exit shall discharge directly outside and the vertical travel to ground level shall not exceed 8 ft (244 cm).

(b) For over 30 clients, a minimum of two exits shall be provided directly outside with one of the two exiting at ground level.

Exception: The exit directly to ground level is not required if the exits are protected in accordance with 5-1.3 and either smoke detectors or automatic sprinklers are provided in that story and the level of discharge.

11-7.2.5 Arrangement of Means of Egress. (*When the story below the exit discharge is used, see also 11-7.2.4.2.*)

11-7.2.6 Travel Distance to Exits.

11-7.2.6.1 Travel distance shall be measured in accordance with Section 5-6.

11-7.2.6.2 Travel distance:

(a) Between any room door intended as exit access and an exit shall not exceed 100 ft (30 m);

(b) Between any point in a room and an exit shall not exceed 150 ft (45 m);

(c) Between any point in a sleeping room and an exit access door of that room shall not exceed 50 ft (15 m).

Exception: The travel distance in (a) and (b) above may be increased by 50 ft (15 m) in buildings protected throughout by an approved automatic sprinkler system in accordance with Section 7-7.

11-7.2.7 Discharge from Exits. (*When the story below the exit discharge is used, see also 11-7.2.4.2.*) All such exits shall discharge directly to the outside.

11-7.2.8 Illumination of Means of Egress. Illumination of the means of egress shall be provided in accordance with Section 5-8.

11-7.2.9 Emergency Lighting. Emergency lighting shall be provided in accordance with 11-2.9.

11-7.2.10 Marking of Means of Egress. Marking of means of egress shall be provided in accordance with Section 5-10.

11-7.2.11 Special Features.

11-7.2.11.1* Every closet door latch shall be such that children can open the door from inside the closet.

11-7.2.11.2 Every bathroom door lock shall be designed to permit opening of the locked door from the outside in an emergency. The opening device shall be readily accessible to the staff.

11-7.3 Protection.

11-7.3.1 Protection of Vertical Openings. Any vertical opening shall be enclosed and protected in accordance with Section 6-2.

11-7.3.2 Protection from Hazards. Rooms or spaces for the storage, processing, or use of the materials specified in this section shall be protected in accordance with the following:

(a) Rooms or spaces used for the storage of combustible supplies in quantities deemed hazardous by the authority having jurisidiction, hazardous materials in quantities deemed hazardous by recognized standards, or fuel shall be separated from the remainder of the building by construction having not less than a 1-hour fire resistance rating with all openings protected by self-closing or smoke-actuated fire doors, or such rooms or spaces may be protected by an automatic extinguishing system as set forth in Section 6-4.

(b) Rooms or spaces used for processing or use of combustible supplies in quantities considered hazardous by the authority having jurisdiction, hazardous materials, or for flammable or combustible liquids in quantities deemed hazardous by recognized standards shall be separated from the remainder of the building by construction having not less than a 1-hour fire resistance rating with all openings protected by self-closing or smoke-actuated fire doors and shall also be protected by an automatic extinguishing system as set forth in Section 6-4.

(c) Boiler and furnace rooms, laundries and maintenance shops, including woodworking and painting areas, shall be separated from the remainder of the building by construction having not less than a 1-hour fire resistance rating with all openings protected by self-closing or smoke-actuated fire doors or such areas may be protected by an automatic extinguishing system as set forth in Section 6-4.

Exception to (c): Rooms enclosing air-handling equipment.

(d) When automatic extinguishing systems are used to meet the requirements of this section, the rooms or spaces shall be separated from the remainder by a physical barrier of such construction so as to contain the heat or smoke generated by a fire to allow for ready extinguishing system activation.

Exception: Food preparation facilities protected in accordance with 7-2.3 are not 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 is not required if approved by the authority having jurisdiction.

11-7.3.3 Interior Finish.

11-7.3.3.1 Interior finish for all walls and ceilings shall be Class A or Class B in accordance with Section 6-5.

11-7.3.4 Detection, Alarm and Communications Systems.

11-7.3.4.1 General. Day-care centers shall be provided with a fire alarm system in accordance with Section 7-6.

Exception No. 1: Day-care centers housed in one room.

Exception No. 2: Day-care centers with a required staff of fewer than four persons based on 11-7.1.1.1.

11-7.3.4.2 Initiation. Initiation of the required fire alarm system shall be by manual means and by operation of any required smoke detectors (*see 11-7.3.4.5*).

11-7.3.4.3 Occupant Notification. Occupant notification shall be by means of an audible alarm in accordance with 7-6.3.

11-7.3.4.4 Emergency Forces Notification. Fire department notification shall be accomplished in accordance with 7-6.4.

Exception: Day-care centers with not more than 100 clients.

11-7.3.4.5 Detection. A smoke detection system shall be installed in accordance with Section 7-6 with placement of detectors in each story in front of doors to the stairways and at no greater than 30 ft (9.1 m) spacing in the corridors of all floors containing the center. Detectors shall also be installed in lounges, recreation areas and sleeping rooms in the center.

Exception No. 1: Centers housing clients 6 years of age or older, if no sleeping facilities are provided.

Exception No. 2: Centers housed in only one room.

11-7.3.5 Extinguishment Requirements.

11-7.3.5.1 Standpipes for fire department use shall be installed in all buildings of six stories or more housing day-care centers. (*See Section 7-7.*)

11-7.3.6 Corridors. Exit access corridors within day-care centers shall comply with 11-3.6.1. (*See 11-7.1.2.*)

11-7.4 Special Provisions. (None.)

11-7.5 Building Services.

11-7.5.1 Utilities.

11-7.5.1.1 Utilities shall comply with the provisions of Section 7-1.

11-7.5.1.2 Special protective covers for all electrical receptacles shall be installed in all areas occupied by children under 6 years of age.

11-7.5.2 Heating, ventilating, and air conditioning equipment shall be in accordance with Section 7-2.

11-7.5.3 Elevators, dumbwaiters, and vertical conveyors shall comply with the provisions of Section 7-4.

11-7.5.4 Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 7-5.

SECTION 11-8* GROUP DAY-CARE HOMES

11-8.1 General Requirements.

11-8.1.1 Application.

11-8.1.1.1* This section establishes life safety requirements for group day-care homes in which at least 7 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). The provisions of Sections 11-2 through 11-6 shall not apply to this section unless a specific requirement is referenced by this section.

11-8.1.2 Mixed Occupancies.

(a) When a group home is located in a building containing mixed occupancies, the occupancies shall be separated by 1-hour fire barriers.

Exception to (a): In assembly occupancies used primarily for worship.

(b) Homes in Apartment Buildings.

1. If the two exit accesses from the home enter the same corridor as the 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. The smoke barrier shall be so located that there is an exit on each side of it.

2. The door in the smoke barrier shall be not less than 36 in. (91 cm) wide.

Exception to (b)2: Existing doors not less than 32 in. (81 cm) wide may be accepted.

3. The door assembly in the smoke barrier shall have a fire protection rating of at least 20 minutes and shall be self-closing or automatic-closing in accordance with 5-2.1.8.

11-8.1.3 Special Definitions. (None.)

11-8.1.4 Classification of Occupancy. No Requirements.

11-8.1.5 Classification of Hazard of Contents. The contents shall be classified as ordinary hazard in accordance with Section 4-2.

11-8.1.6* Minimum Construction Requirements. (None.)

11-8.1.7 Occupant Load. No Special Requirements.

11-8.2 Means of Egress Requirements.

11-8.2.1 General. (None.)

11-8.2.2 Types of Exits. (*See 11-8.2.4.*)

11-8.2.3 Capacity of Means of Egress. (*See 11-2.3.*)

11-8.2.4 Number of Exits.

11-8.2.4.1 Each floor occupied by clients shall have not less than two remote means of escape.

11-8.2.4.2 Where spaces on the floor above the floor of exit discharge are used for sleeping purposes by clients, at least one means of egress shall be an exit discharging directly to the outside. The second means of escape may be a window in accordance with 11-2.11.5.

11-8.2.4.3 Where clients are located on a story below the level of exit discharge (basement), at least one means of egress shall be an exit discharging directly to the outside and the vertical travel to ground level shall not exceed 8 ft (244 cm). The second means of escape may be a window in accordance with 11-2.11.5. No facility shall be located more than one story below the ground. Any stairway to the story above shall be cut off by a fire barrier containing a door of at least a 20-minute fire protection rating, equipped with a self-closing device.

11-8.2.5 Arrangement of Means of Egress. (*When a story above or below the exit discharge is used, see 11-8.2.4.*)

11-8.2.6 Travel Distance to Exits. (*See 11-2.6.*)

11-8.2.7 Discharge from Exits. (*When the story above or below the exit discharge is used, see 11-8.2.4.*)

11-8.2.8 Illumination of Means of Egress. Illumination of the means of egress shall be provided in accordance with Section 5-8.

11-8.2.9 Emergency Lighting. No Requirements.

11-8.2.10 Marking of Means of Egress. No Requirements.

11-8.2.11 Special Requirements.

11-8.2.11.1* Every closet door latch shall be such that children can open the door from the inside of the closet.

11-8.2.11.2 Every bathroom door lock shall be designed to permit opening of the locked door from outside in an emergency. The opening device shall be readily accessible to the staff.

11-8.3 Protection.

11-8.3.1 Protection of Vertical Openings. The doorway between the level of exit discharge and any floor below shall be equipped with a door assembly having a 20-minute fire protection rating. Where the floor above the floor 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 1¾-in. (4.4-cm) solid bonded wood core doors without rated frames may be accepted by the authority having jurisdiction.

11-8.3.2 Protection from Hazards. No Requirements.

11-8.3.3 Interior Finish.

11-8.3.3.1 The interior finish in exits shall be Class A or B in accordance with Section 6-5.

11-8.3.3.2 Interior finish in occupied spaces in the home shall be Class A, B or C, in accordance with Section 6-5.

11-8.3.4 Detection, Alarm and Communications Systems.

11-8.3.4.1 Within the group day-care home, smoke detectors shall be installed in accordance with 7-6.2.7.

Exception: Houses housing clients 6 years of age or older, if no sleeping facilities are provided.

11-8.3.4.2 When the group day-care home is located within a building of another occupancy, such as in apartment or office buildings, any corridors serving the group day-care home shall be provided with a smoke detection system in accordance with Section 7-6, with placement of detectors at no greater than 30 ft (9.1 m) spacing.

11-8.3.4.3 Alarm Systems. No Requirements.

11-8.4 Special Provisions. (None.)

11-8.5 Building Services.

11-8.5.1 Electrical Services.

11-8.5.1.1 Electrical wiring shall be installed in accordance with Section 7-1.

11-8.5.1.2 Special protective covers for electrical receptacles shall be installed in all areas occupied by children under 6 years of age.

11-8.5.2 Heating Equipment.

11-8.5.2.1 Any heaters in spaces occupied by children shall be separated from the space by partitions, screens, or other means.

11-8.5.2.2 If solid partitions are used to provide the separation required in 11-8.5.2.1, provision shall be made to assure adequate air for combustion and ventilation for the heating equipment.

SECTION 11-9* FAMILY DAY-CARE HOMES

11-9.1 General Requirements.

11-9.1.1 Application.

11-9.1.1.1* This section establishes life safety requirements for licensed family day-care homes in which fewer than 7 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). The provisions of Sections 11-2 through 11-6 shall not apply to this section unless a specific requirement is referenced by this section.

11-9.1.2 Mixed Occupancies. Where family day-care homes are located in a building containing mixed occupancies, the occupancies shall be separated by 1-hour fire barriers.

Exception: In assembly occupancies used primarily for worship.

11-9.1.3 Special Definitions. (None.)

11-9.1.4 Classification of Occupancies. No Requirements.

11-9.1.5 Classification of Hazard of Contents. (Not specifically classified.)

11-9.1.6* Minimum Construction Requirements. (None.)

11-9.1.7 Occupant Load. No Special Requirements.

11-9.2 Means of Egress Requirements.

11-9.2.1 General. (None.)

11-9.2.2 Types of Exits. (*See 11-9.2.4.*)

11-9.2.3 Capacity of Means of Egress. (*See 11-2.3.*)

11-9.2.4 Number of Exits.

11-9.2.4.1 Every room used for sleeping, living, or dining purposes shall have at least two means of escape, at least 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 may be a window in accordance with 11-2.11.5. No room or space shall be occupied for living or sleeping purposes which is accessible only by a ladder, folding stairs, or through a trap door.

11-9.2.4.2 Where clients are located on a floor (basement) below the level of exit discharge, at least one means of egress shall be an exit discharging directly to the outside, and the vertical travel to ground level shall not exceed 8 ft (244 cm). The second means of escape may be a window in accordance with 11-2.11.5. No facility shall be located more than one story below the ground.

11-9.2.4.3 Stairs. Every stairway shall comply at least with the minimum requirements for stairs as described in 5-2.2 in respect to width, risers, and treads and shall be maintained free of items of storage.

11-9.2.5 Arrangement of Means of Egress. (*See 11-9.2.4.*)

11-9.2.6 Travel Distance to Exits. (*See 11-2.6.*)

11-9.2.7 Discharge from Exits. (*See 11-9.2.4.*)

11-9.2.8 Illumination of Means of Egress. Illumination of the means of egress shall be in accordance with Section 5-8.

11-9.2.9 Emergency Lighting. No Requirements.

11-9.2.10 Marking of Means of Egress. No Requirements.

11-9.2.11 Special Features.

11-9.2.11.1 Each door in a means of egress shall not be less than 24 in. (60 cm) wide.

11-9.2.11.2* Every closet door latch shall be such that children can open the door from inside the closet.

11-9.2.11.3 Every bathroom door lock shall be designed to permit the opening of the locked door from the outside in an emergency. The opening device shall be readily accessible to the staff.

11-9.3 Protection.

11-9.3.1 Protection of Vertical Openings. (No special provisions.)

11-9.3.2 Protection from Hazards. No Requirements.

11-9.3.3 Interior Finish.

11-9.3.3.1 The interior finish in corridors, stairways, lobbies and exits shall be Class A or B in accordance with Section 6-5.

11-9.3.3.2 Interior finish in occupied spaces in the home shall be Class A, B, or C, in accordance with Section 6-5.

11-9.3.4 Detection, Alarm and Communications Systems.

11-9.3.4.1 Within the family day-care home, smoke detectors shall be installed in accordance with 7-6.2.7.

Exception: Homes housing clients 6 years of age or older, if no sleeping facilities are provided.

11-9.3.4.2 When the family day-care home is located within a building of another occupancy such as in apartment or office buildings, any corridors serving the family day-care home shall be provided with a smoke detection system in accordance with Section 7-6, with placement of detectors at no greater than 30 ft (9.1 m) spacing.

11-9.3.4.3 Alarm Systems. No Requirements.

11-9.4 Special Provisions. No Requirements.

11-9.5 Building Services.

11-9.5.1 Electrical Services.

11-9.5.1.1 Electrical wiring shall be installed in accordance with Section 7-1.

11-9.5.1.2 Special protective covers for all electrical receptacles shall be installed in all areas occupied by children in homes for children under 6 years of age.

11-9.5.2 Heating Equipment.

11-9.5.2.1 Unvented fuel-fired room heaters shall not be permitted. Oil- and gas-fired room heaters shall be installed in accordance with Section 7-2. A guard shall be provided to protect the children from hot surfaces and open flames.

Exception: Kerosene-fired unvented room heaters conforming to UL 647, Standard for Unvented Kerosene-fired Room Heaters and Portable Heaters, may be permitted upon approval of the authority having jurisdiction.

CHAPTER 12 NEW HEALTH CARE OCCUPANCIES

(*See also Chapter 31.*)

SECTION 12-1 GENERAL REQUIREMENTS

12-1.1 Application. (*See also Section 1-4.*)

12-1.1.1 General.

12-1.1.1.1 New health care facilities shall comply with the provisions of this chapter. (*See Chapter 31 for operating features.*)

Exception: Hospitals and nursing homes found to have equivalent safety. One such method for determining this equivalency is given in Appendix C.*

12-1.1.1.2 This chapter establishes life safety requirements for the design of all new hospitals, nursing homes, custodial care, and supervisory care facilities. Where requirements vary, the specific occupancy is named in the paragraph pertaining thereto. Section 12-6 establishes life safety requirements for the design of all new ambulatory health care centers.

12-1.1.1.3 Health care occupancies are those used for purposes such as medical or other treatment or care of persons suffering from physical or mental illness, disease or infirmity; for the care of infants, convalescents, or infirm aged persons.

12-1.1.1.4 Health care facilities provide sleeping accommodations for the occupants and are occupied by persons who are mostly incapable of self-preservation because of age, physical or mental disability, or because of security measures not under the occupants' control.

12-1.1.1.5 This chapter also covers ambulatory health care centers as defined in 12-1.3(e). See Section 12-6 for requirements.

12-1.1.1.6* Buildings or sections of buildings which house, or in which care is rendered to, patients who are capable of judgment and appropriate physical action for self-preservation under emergency conditions in the opinion of the governing body of the facility and the governmental agency having jurisdiction may come under other chapters of the *Code* instead of Chapter 12.

12-1.1.1.7 It shall be recognized that, in buildings housing certain types of patients or having detention rooms or a security section, it may 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* which would otherwise require the keeping of exits unlocked.

12-1.1.1.8 It shall be also recognized that some mental health patients are not capable of seeking safety without guidance.

12-1.1.1.9 Buildings or sections of buildings which house older persons and which provide activities that foster continued independence but do not include those services distinctive to health care facilities [as defined in 12-1.3(c)] may be subject to the requirements of other sections of this *Code*, such as Chapters 18 or 21.

12-1.1.1.10 Health care occupancies shall include all buildings or parts thereof with occupancy as described in this chapter under Special Definitions, 12-1.3.

12-1.1.2* Objective. The objective of this chapter is to provide a reasonable level of safety by reducing the probability of injury and loss of life from the effects of fire 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.

12-1.1.3 Total Concept. All health care facilities shall be so designed, constructed, maintained, and operated as to minimize the possibility of a fire emergency requiring the evacuation of occupants. Because the safety of health care occupants cannot be assured adequately by dependence on evacuation of the building, their protection from fire shall be provided by appropriate arrangement of facilities, adequate staffing, and careful development of operating and maintenance procedures composed of the following:

(a) Proper design, construction, and compartmentation; and

(b) Provision for detection, alarm, and extinguishment; and

(c) Fire prevention and the planning, training, and drilling in programs for the isolation of fire, transfer of occupants to areas of refuge, or evacuation of the building.

12-1.1.4 Additions, Conversions, Modernization, Renovation, and Construction Operations. (*See also 1-4.5 and 1-4.6.*)

12-1.1.4.1 Additions shall be separated from any existing structure not conforming to the provisions within Chapter 13 by a fire barrier having at least a 2-hour fire resistance rating constructed of materials as required for the addition.

12-1.1.4.2 Communicating openings in dividing fire barriers required by 12-1.1.4.1 shall occur only in corridors and shall be protected by approved self-closing fire doors. (*See also Section 6-2.*)

12-1.1.4.3 Doors in barriers required by 12-1.1.4.1 shall normally be kept closed.

Exception: Doors may be held open only if they meet the requirements of 12-2.11.5.

12-1.1.4.4* Conversions. Conversions shall comply with 1-6.4.

12-1.1.4.5 Construction Operations. See 1-6.3 and Chapter 31 for life safety provisions during construction.

12-1.2 Mixed Occupancies. (*See also 1-4.7.*)

12-1.2.1* Sections of health care facilities may be classified as other occupancies if they meet all of the following conditions:

(a) They are not intended to serve health care occupants for purposes of:

1. Housing, or
2. Treatment, or
3. Customary access by patients incapable of self-preservation.

(b) They are adequately separated from areas of health care occupancies by construction having a fire resistance rating of at least 2 hours.

12-1.2.2 Ambulatory care (*see Section 12-6*), medical clinics and similar facilities which are contiguous to health care occupancies but are primarily intended to provide outpatient services may be classified as a business or ambulatory care occupancy provided the facilities are separated from health care occupancies by not less than 2-hour fire-resistive construction.

Exception: When the business occupancy or similar facility is intended to provide:*

(a) Services for hospital patients who are litter borne, or,

(b) General anesthesia services,

the section shall meet all requirements for health care facilities.

12-1.2.3 Health care occupancies in buildings housing other occupancies shall be completely separated from them by construction having a fire resistance rating of at least 2 hours as provided for additions in 12-1.1.4.

12-1.2.4 All means of egress from health care occupancies that traverse non-health care spaces shall conform to requirements of this *Code* for health care occupancies.

Exception: It is permissible to exit through a horizontal exit into other contiguous occupancies which do not conform to health care egress provisions but which do comply with requirements set forth in the appropriate occupancy chapter of this Code, as long as the occupancy does not have high hazard contents. The horizontal exit must comply with the requirements of 12-2.2.4.

12-1.2.5 Auditoriums, chapels, staff residential areas or other occupancies provided in connection with health care facilities shall have exits provided in accordance with other applicable sections of the *Code*.

12-1.2.6 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 12-3.2.

12-1.2.7 Non-health care related occupancies classified as containing high-hazard contents shall not be permitted in buildings housing health care occupancies.

12-1.3 Special Definitions.

(a) **Hospital.** A building or part thereof used for the medical, psychiatric, obstetrical or surgical care, on a 24-hour basis, of four or more inpatients. Hospital, wherever used in this *Code*, shall include general hospitals, hospitals for psychiatric care, tuberculosis hospitals, children's hospitals, and any such facilities providing inpatient care.

(b) **Nursing Home.** A building or part thereof used for the housing and nursing care, on a 24-hour basis, of four or more persons who, because of mental or physical incapacity, may be unable to provide for their own needs and safety without the assistance of another person. 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.

(c) **Custodial Care Facility.** A building, or part thereof, used for the housing, on a 24-hour basis, of four or more persons who are incapable of self-preservation because of age or physical or mental limitation. The following types of facilities, when accommodating persons of the above description, shall be classified as custodial care facilities:

1. Nursery facilities that provide full-time care for children under 6 years of age.

2. Facilities for the care of the mentally retarded that normally provide housing and custodial care on a 24-hour basis in an institutional setting such as a hospital or institution for the mentally retarded.

Facilities housing older persons or mental patients, including the mentally retarded, who are judged to be capable of evacuating the building with staff assistance in an emergency, are covered by other chapters of the *Code* (*see 12-1.1.1.6 and 12-1.1.1.9*).

Facilities that do not provide housing on a 24-hour basis for their occupants are classified as Day-Care Centers, Group Day-Care Centers, or Family Day-Care Homes.

(d)* **Supervisory Care Facility.** A building or part thereof used for the housing, on a 24-hour basis, of four or more mental health patients who are capable of self-preservation and who require supervison and who are receiving therapy, training or other health related care and who may have imposed upon them security measures not under their control.

(e) **Ambulatory Health Care Centers.** A building or part thereof used to provide services or treatment to four or more patients at the same time and meeting either (1) or (2) below.

1. Those facilities which provide, on an outpatient basis, treatment for patients which would render them incapable of taking action for self-preservation under emergency conditions without assistance from others, such as hemodialysis units or freestanding emergency medical units.

2. Those facilities which provide, on an outpatient basis, surgical treatment requiring general anesthesia.

12-1.4 Classification of Occupancy. See Definitions, 12-1.3.

12-1.5 Classification of Hazard of Contents. The classification of hazard of contents shall be as defined in Section 4-2.

12-1.6 Minimum Construction Requirements.

12-1.6.1 For the purpose of 12-1.6, stories shall be counted starting at the primary level of exit discharge and ending at the highest occupiable level. For the purposes of this section, the primary level of exit discharge of a building shall be that floor which 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 a building.

12-1.6.2 Health care occupancies shall be limited to the following types of building construction (*see 6-2.1*):

Construction Type	1 story	2 stories	3 stories	3 stories to 75 ft	over 75 ft
I (443) I (332) II (222)	X	X	X	X	X†
II (111)	X	X†	X†	N.P.	N.P.
II (000)	X†	N.P.	N.P.	N.P.	N.P.
IV (2HH)	X†	N.P.	N.P.	N.P.	N.P.
III (211)	X†	N.P.	N.P.	N.P.	N.P.
V (111)	X†	N.P.	N.P.	N.P.	N.P.

X = Permitted type of construction
X† = Building requires automatic sprinkler protection (*See 12-3.5.1*)
N.P. = Not Permitted

Exception: Any building of Type I or Type II (222 or 111) construction may include roofing systems involving combustible supports, decking, or roofing provided: (1) the roof covering meets Class A requirements in accordance with NFPA 256, Fire Tests for Roof Coverings, and (2) the roof is separated from all occupied portions of the building by a noncombustible floor assembly having at least a 2-hour fire resistance rating which includes at least 2½ in. (6.4 cm) of concrete or gypsum fill. To qualify for this exception, the attic or other space so developed shall either be unoccupied or protected throughout by an approved automatic sprinkler system.

12-1.6.3 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 at least Type II (111) construction.

12-1.6.4 For construction requirements of enclosures of vertical openings between floors, see 12-3.1.

12-1.6.5 All interior walls and partitions in buildings of Type I or Type II construction shall be of noncombustible or limited-combustible materials.

12-1.6.6* Openings for the passage of pipes or conduit in walls or partitions that are required to have fire or smoke resisting capability shall be protected in accordance with 6-2.2.8 or 6-3.5.1.

12-1.7 Occupant Load. The occupant load for which means of egress shall be provided for any floor shall be the maximum number of persons intended to occupy that floor, but not less than one person for each 120 sq ft (11.1 sq m) gross floor area in health care sleeping departments and not less than one person for each 240 sq ft (22.3 sq m) of gross floor area of inpatient health care treatment departments. Gross floor areas shall be measured within the exterior building walls with no deductions. (*See Chapter 3.*)

SECTION 12-2 MEANS OF EGRESS REQUIREMENTS

12-2.1 General. Every aisle, passageway, corridor, exit discharge, exit location and access shall be in accordance with Chapter 5.

Exception No. 1: As modified in the following paragraphs.

Exception No. 2: The requirements of Chapter 5 specifying net clear door width do not apply. Projections into the door opening by stops or by hinge stiles shall be permitted.

12-2.2* Types of Exits. Exits shall be restricted to the permissible types described in 12-2.2.1 through 12-2.2.6.

12-2.2.1 Doors Leading Directly Outside the Building. (*See 5-2.1.*)

12-2.2.2 Stairs. (*See 5-2.2.*)

12-2.2.3 Smokeproof Enclosures. (*See 5-2.3.*)

12-2.2.4* Horizontal Exits. A horizontal exit shall be in conformance with 5-2.4, modified as below.

(a) At least 30 net sq ft (2.8 sq m) per patient in a hospital or nursing home or 15 net sq ft (1.4 sq m) per resident in a custodial care facility shall be provided within the aggregated area of corridors, patient rooms, treatment rooms, lounge or dining areas and other low hazard areas on each side of the horizontal exit. On stories not housing bed or litter patients and in supervisory care facilities at least 6 net sq ft (.56 sq m) per occupant shall be provided on each side of the horizontal exit for the total number of occupants in adjoining compartments.

(b) A single door leaf may be used as a horizontal exit if it serves one direction only and is at least 44 in. (112 cm) wide.

Exception: A door leaf a minimum of 36 in. (91 cm) wide may be provided within custodial care facilities, hospitals for psychiatric care, and supervisory care facilities.

(c) A horizontal exit in a hospital or nursing home in a corridor 8 ft (244 cm) 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 the opposite direction from the other, with each door being at least 44 in. (112 cm) wide.

(d) A horizontal exit in a custodial care facility, hospital for psychiatric care, or supervisory care facility in a corridor 6 ft (183 cm) 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 the opposite direction from each other, with each door being at least 34 in. (86 cm) wide.

(e) An approved vision panel is required in each horizontal exit door. Center mullions are prohibited.

(f) The total exit capacity of the other exits (stairs, ramps, doors leading outside the building) shall not be reduced below one-third that required for the entire area of the building.

12-2.2.5 Class A Ramps. (*See 5-2.5.*) Ramps enclosed as exits shall be of sufficient width to provide exit capacity in accordance with 12-2.3.2.

Exception: A Class B ramp may be used where the height of the ramp is 1 ft (30.5 cm) or less.

12-2.2.6 Exit Passageways. (*See 5-2.6.*)

12-2.3 Capacity of Means of Egress.

12-2.3.1 The capacity of any required means of egress shall be based on its width as defined in Section 5-3.

12-2.3.2* The capacity of means of egress providing travel by means of stairs shall be 22 persons per exit unit; and the capacity of means of egress providing horizontal travel (without stairs) such as doors, ramps, or horizontal exits, shall be 30 persons per exit unit.

Exception: The capacity of means of egress in health care occupancies protected throughout by an approved automatic sprinkler system may be increased to 35 persons per exit unit for travel by means of stairs, and to 45 persons per exit unit for horizontal travel without stairs.

12-2.3.3* Aisles, corridors and ramps required for exit access in a hospital or nursing home shall be at least 8 ft (244 cm) in clear and unobstructed width. When ramps are used as exits, see 12-2.2.5.

Exception: Corridors and ramps in adjunct areas not intended for the housing, treatment, or use of patients may be a minimum of 44 in. (112 cm) in clear and unobstructed width.

12-2.3.4* Aisles, corridors and ramps required for exit access in a custodial care facility or hospital for psychiatric care shall be at least 6 ft (183 cm) in clear and unobstructed width. When ramps are used as exits, see 12-2.2.5.

Exception: Corridors and ramps in adjunct areas not intended for the housing, treatment, or use of patients may be a minimum of 44 in. (112 cm) in clear and unobstructed width.

12-2.3.5 Aisles, corridors, and ramps required for exit access in a supervisory care facility shall be at least 5 ft (152 cm) in clear and unobstructed width. When ramps are used as exits, see 12-2.2.5.

12-2.3.6 The minimum width of 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:

(a) Hospitals and nursing homes: 44 in. (112 cm).

(b) Custodial care facilities, hospitals for psychiatric care, and supervisory care facilities: 36 in. (91 cm).

Exception No. 1: Doors which are so located as not to be subject to use by any health care occupant may be not less than 34 in. (86 cm) wide.

Exception No. 2: Doors in exit stair enclosures shall not be less than 36 in. (91 cm) wide.

Exception No. 3: Newborn nurseries may be served by 36 in. (91 cm) doors.

12-2.3.7 Door leaves from patient rooms shall be a minimum of 44 in. (112 cm).

Exception: A 36-in. (91-cm) door leaf may be used in conjunction with an inactive leaf of at least 8 in. (20.3 cm) with a rabbet, bevel or astragal at the meeting edge.

12-2.4 Number of Exits.

12-2.4.1 At least two exits of the types described in 12-2.2.1 through 12-2.2.6, located remotely from each other, shall be provided for each floor or fire section of the building.

12-2.4.2 At least one exit from each floor or fire section shall be either:

(a) A door leading directly outside the building, or

(b) A stair, or

(c) A smokeproof enclosure, or

(d) A ramp, or

(e) An exit passageway.

Any fire section not meeting these requirements shall be considered as part of an adjoining zone. Egress shall not require return through the zone of fire origin.

12-2.4.3* At least two exits of the types described in 12-2.2.1 through 12-2.2.6 shall be accessible from each smoke compartment. Egress may be through adjacent compartment(s), but shall not require return through the compartment of fire origin.

12-2.5 Arrangement of Means of Egress.

12-2.5.1 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: For patient sleeping rooms, one adjacent room, such as a sitting or anteroom, may intervene, if the intervening room is not used to serve as an exit access for more than eight patient sleeping beds.

Exception No. 3: Exception No. 2 above shall apply to special nursing suites permitted in 12-2.5.3 and suites in supervisory care facilities without being limited to eight beds or basinettes.

Exception No. 4: For rooms other than patient sleeping rooms, one or more adjacent rooms, such as offices, work rooms, etc., may intervene provided that such intervening rooms are not hazardous areas as defined in 12-3.2.

12-2.5.2 Any patient sleeping room, or any suite which includes patient sleeping rooms, of more than 1,000 sq ft (93 sq m) shall have at least two exit access doors remote from each other.

Any room or any suite of rooms, other than patient sleeping rooms, of more than 2,500 sq ft (230 sq m) shall have at least two exit access doors remote from each other.

12-2.5.3 Any patient sleeping room which complies with the requirements previously set forth in this section may be subdivided with non-fire-rated, noncombustible or limited-combustible partitions, provided that the arrangement allows for direct and constant visual supervision by nursing personnel. Rooms which are so subdivided shall not exceed 5,000 sq ft (460 sq m).

Exception: In supervisory care facilities, such spaces continuously monitored by staff do not require direct visual supervision providing the space is equipped with an electrically supervised smoke detection system.

12-2.5.4 Any suite of rooms other than patient sleeping rooms, which complies with the requirements previously set forth in this section, may be subdivided with non-fire-rated, noncombustible or limited-combustible partitions. Such suites shall not exceed 10,000 sq ft (930 sq m) in area and either:

(a) The maximum travel distance from any point in the suite to a corridor door is limited to 50 ft (15 m), or

(b) There is unrestricted access from patient treatment areas to a corridor with a maximum of one intervening room.

12-2.5.5 Every corridor shall provide access to at least two approved exits in accordance with Sections 5-4 and 5-5 without passing through any intervening rooms or spaces other than corridors or lobbies.

12-2.5.6 Every exit or exit access shall be so arranged that no corridor, aisle or passageway has a pocket or dead end exceeding 30 ft (9.1 m).

12-2.6 Travel Distance to Exits.

12-2.6.1 Travel distance shall be measured in accordance with Section 5-6.

12-2.6.2 Travel distance:

(a) Between any room door required as exit access and an exit shall not exceed 100 ft (30 m);

(b) Between any point in a room and an exit shall not exceed 150 ft (45 m);

Exception: The travel distance in (a) or (b) above may be increased by 50 ft (15 m) in buildings protected throughout by an approved automatic sprinkler system.

(c) Between any point in a health care sleeping room and an exit access door of that room shall not exceed 50 ft (15 m).

(d) Between any point in a suite of rooms as permitted by 12-2.5 and an exit access door of that suite shall not exceed 100 ft (30 m) and meeting (b) above.

12-2.7 Discharge from Exits. (*See Section 5-7.*)

12-2.7.1 All required exit ramps or stairs shall discharge directly to the outside at grade or be arranged to travel through an exit passageway discharging to the outside at grade.

Exception: A maximum of 50 percent of the required exits may discharge through areas on the floor of exit discharge in accordance with 5-7.2.

12-2.8 Illumination of Means of Egress.

12-2.8.1 Each facility as indicated within 12-1.1.1.2 shall be provided with illumination of means of egress in accordance with Section 5-8.

12-2.8.2 Buildings equipped with or in which patients require the use of life support systems (*see 12-5.1.3*) shall have illumination to the extent prescribed by 5-8.1.3 for the means of egress supplied by the Life Safety Branch of the electrical system as described in Chapter 8, "Essential Electrical Systems for Health Care Facilities," of NFPA 99, *Standard for Health Care Facilities.*

12-2.9 Emergency Lighting.

12-2.9.1 Each facility as indicated within 12-1.1.1.2 shall be provided with emergency lighting in accordance with Section 5-9.

12-2.9.2 Buildings equipped with or in which patients require the use of life support systems (*see 12-5.1.3*) shall have emergency lighting equipment supplied by the Life Safety Branch of the electrical system as described in Chapter 8, "Essential Electrical Systems for Health Care Facilities," of NFPA 99, *Standard for Health Care Facilities.*

12-2.10 Marking of Means of Egress.

12-2.10.1 Each facility as indicated within 12-1.1.1.2 shall be provided with exit marking in accordance with Section 5-10.

12-2.10.2 Buildings equipped with or in which patients require the use of life support systems (*see 12-5.1.3*) shall have illumination of the required exit and directional signs supplied by the Life Safety Branch of the electrical system as described in Chapter 8, "Essential Electrical Systems for Health Care Facilities," of NFPA 99, *Standard for Health Care Facilities.*

12-2.11 Special Features.

12-2.11.1 Locks shall not be permitted on patient sleeping room doors.

Exception No. 1: Key locking devices which restrict access to the room from the corridor and which are operable only by staff from the corridor side may be permitted. Such devices shall not restrict egress from the room.

Exception No. 2: Doors in homes for the aged may be lockable by the occupant, if they can be unlocked from the opposite side and keys are carried by attendants at all times. (See also 5-2.1.5.1 and 5-2.1.5.3.)

Exception No. 3: Door locking arrangements are permitted in mental health facilities. (See 12-1.1.1.7 and 12-2.11.4.)

12-2.11.2 Doors not in a required means of egress may be subject to locking.

12-2.11.3 Doors within a required means of egress shall not be equipped with a latch or lock which requires the use of a tool or key from the egress side.

Exception No. 1: Door locking arrangements are permitted in mental health facilities. (See 12-1.1.1.7 and 12-2.11.4.)

Exception No. 2: Special locking arrangements in accordance with 5-2.1.6 on exterior doors are permitted.

12-2.11.4 In buildings in which doors are locked, provisions shall be made for the rapid removal of occupants by such reliable means as the remote control of locks or by keying all locks to keys readily available to staff who are in constant attendance.

12-2.11.5* 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) may be held open only by an automatic release device which complies with 5-2.1.8. The required manual fire alarm system and the systems required by 5-2.1.8(d) shall be arranged so as to initiate the closing action of all such doors by zone or throughout the entire facility.

12-2.11.6 Where doors in a stair enclosure are held open by an automatic device as permitted in 12-2.11.5, initiation of a door closing action on any level shall cause all doors at all levels in the stair enclosure to close.

12-2.11.7 Health care occupancies shall comply with the provisions of 5-2.1.5.2. Selected doors on stairways may be equipped with hardware that prevents reentry in accordance with 5-2.1.5.2 Exception No. 1.

Exception: Health care occupancy buildings not over 75 ft (23 m) in height, measured from the lowest level of fire department vehicle access to the floor of the highest occupiable story.

SECTION 12-3 PROTECTION

12-3.1 Protection of Vertical Openings.

12-3.1.1 Any stairway, ramp, elevator hoistway, light or ventilation shaft, chute, and other vertical opening between stories shall be enclosed in accordance with 6-2.2 with construction having a 2-hour fire resistance rating.

Exception No. 1: One-hour rated enclosures are permitted in buildings required to be of 1-hour construction.

Exception No. 2: Stairs that do not connect to a corridor, do not connect more than two levels, and do not serve as a means of egress need not comply with these regulations.

Exception No. 3: The fire resistance rating of enclosures in health care occupancies protected throughout by an approved automatic sprinkler system may be reduced to 1 hour in buildings up to, and including, three stories in height.

Exception No. 4: Duct penetrations of floor assemblies which are protected in accordance with NFPA 90A, Standard for the Installation of Air Conditioning and Ventilating Systems.

Exception No. 5: Floor and ceiling openings for pipes or conduits when the opening around the pipes or conduits is sealed in an approved manner. (See 6-2.2.8.)*

Exception No. 6: An atrium may be utilized in accordance with 6-2.2.3.5.

12-3.1.2 A door in a stair enclosure shall be self-closing, shall normally be kept in a closed position, and shall be marked in accordance with 5-10.4.2.

Exception: Doors in stair enclosures may be held open under the conditions specified by 12-2.11.5 and 12-2.11.6.

12-3.2 Protection from Hazards.

12-3.2.1* Any hazardous area shall be safeguarded by a fire barrier of 1-hour fire resistance rating or provided with an automatic extinguishing system in accordance with 6-4.1. Those areas accompanied by a dagger (†) in the list shall have both fire-resistant separation and a complete extinguishment system.

Hazardous areas include, but are not restricted to, the following:

Boiler and heater rooms
Laundries
Repair shops
Handicraft shops
Employee locker rooms
†Soiled linen rooms
†Paint shops
†Trash collection rooms
†Rooms or spaces, including repair shops, used for the storage of combustible supplies and equipment in quantities deemed hazardous by the authority having jurisdiction.
Laboratories employing quantities of flammable, or combustible materials less than that which would be considered severe.

12-3.2.2* Laboratories employing quantities of flammable, combustible, or hazardous materials which are considered as severe hazard shall be protected in accordance with Chapter 7, "Laboratories in Health-Related Institutions," of NFPA 99, *Standard for Health Care Facilities.*

12-3.2.3 Gift Shops. Gift shops shall be protected as hazardous areas when used for the storage or display of combustibles in quantities considered hazardous. Gift shops not considered hazardous and having separately protected storage may be:

(a) Open to a lobby if the gift shop is not greater than 500 sq ft (46.5 sq m) and is protected throughout by an approved automatic sprinkler system, or

(b) Separated from a lobby with non-fire-rated walls if the gift shop is protected throughout by an approved automatic sprinkler system, or

(c) Separated from corridors by non-fire-rated walls if the gift shop is protected throughout by an approved automatic sprinkler system.

12-3.2.4 Cooking facilities shall be protected in accordance with 7-2.3.

Exception: Where domestic cooking equipment is used for food warming or limited cooking, protection or segregation of food preparation facilities is not required.*

12-3.3 Interior Finish.

12-3.3.1 Interior finish of walls and ceilings throughout shall be Class A in accordance with Section 6-5.

Exception No. 1: Walls and ceilings may have Class A or B interior finish in individual rooms of not over four persons in capacity.

Exception No. 2: Corridor wall finish up to 4 ft (122 cm) in height, that is restricted to the lower half of the wall, may be Class A or B.

12-3.3.2* Interior floor finish in corridors and exits shall be Class I in accordance with Section 6-5.

12-3.4 Detection, Alarm and Communications Systems.

12-3.4.1 General.

12-3.4.1.1 Health care occupancies shall be provided with a fire alarm system in accordance with Section 7-6.

12-3.4.1.2 All required fire alarm systems shall be electrically supervised.

12-3.4.1.3 All required fire alarm systems and detection systems shall be provided with a secondary power supply in accordance with NFPA 72A, *Standard for the Installation, Maintenance, and Use of Local Protective Signaling Systems.*

12-3.4.2 Initiation. Initiation of the required fire alarm systems shall be by manual means, in accordance with 7-6.2, and by means of any detection devices or detection systems required.

Exception: Fire alarm pull stations in patient sleeping areas may be omitted at exits if located at all nurses' control stations or other continuously attended staff location, provided such pull stations are visible and continuously accessible and that travel distances of 7-6.2.4 are not exceeded.

12-3.4.3 Notification.

12-3.4.3.1 Occupant Notification. Occupant notification shall be accomplished automatically, without delay, upon operation of any fire alarm activating device by means of an

internal audible general alarm in accordance with 7-6.3. Presignal systems are prohibited.

Exception: Zoned, coded systems shall be permitted.

12-3.4.3.2 Emergency Forces Notification. Fire department notification shall be accomplished in accordance with 7-6.4.

12-3.4.4 Emergency Control. Operation of any activating device in the required fire alarm system shall be arranged to automatically accomplish, without delay, any control functions to be performed by that device (*see 7-6.5*).

12-3.4.5 Detection. An approved automatic smoke detection system shall be installed in all corridors of nursing homes, custodial care and supervisory care facilities. Such systems shall be installed in accordance with Section 7-6, but in no case shall smoke detectors be spaced further apart than 30 ft (9.1 m) on centers or more than 15 ft (4.5 m) from any wall.

Exception: Where each patient sleeping room is protected by such an approved detection system and a local detector is provided at the smoke barrier and horizontal exits, such corridor systems will not be required on the patient sleeping room floors.

12-3.5 Extinguishment Requirements.

12-3.5.1 All health care facilities shall be protected throughout by an approved automatic sprinkler system. (*See 12-1.6 for construction types permitted.*)

Exception: Buildings of Type I (443), I (332) or II (222) construction less than 75 ft (23 m) in height measured from the lowest level of fire department vehicle access to the floor of the highest occupiable story and buildings of Type II (111) construction not over one story in height.

12-3.5.2 Where exceptions are stated in the provisions of the *Code* for health care occupancies protected throughout by an approved automatic sprinkler system, and where such systems are required, the systems shall be in complete accordance with Section 7-7 for systems in light hazard occupancies and shall be electrically interconnected with the fire alarm system.

12-3.5.3 The main sprinkler control valve(s) shall be electrically supervised so that at least a local alarm will sound at a constantly attended location when the valve is closed.

12-3.5.4 Sprinkler piping serving not more than six sprinklers for any isolated hazardous area may be connected directly to a domestic water supply system having a capacity sufficient to provide 0.15 gal per minute per sq ft (6.1 L/min/sq m) of floor area throughout the entire enclosed area. An indicating shut-off valve shall be installed in an accessible location between the sprinklers and the connection to the domestic water supply. When more than two sprinklers are installed in a single area, water flow detection shall be provided to sound the building fire alarm, or notify by a signal any constantly attended location such as PBX, security, or emergency room, whereby necessary corrective action shall be directed.

12-3.5.5 Portable fire extinguishers shall be provided in all health care occupancies in accordance with 7-7.4.1.

12-3.6 Construction of Corridor Walls.

12-3.6.1* Corridors shall be separated from all other areas by partitions. Such partitions shall be continuous from the floor slab to the underside of the roof or floor slab above, through any concealed spaces such as those above the suspended ceilings, and through interstitial structural and mechanical spaces, and shall have a fire resistance rating of at least 1 hour.

Exception No. 1: In health care occupancies protected throughout by an approved automatic sprinkler system, a corridor may be separated from all other areas by non-fire-rated partitions, and where suspended ceilings are provided, the partitions may be terminated at the suspended ceiling.

Exception No. 2: Corridor partitions may terminate at ceilings which are not an integral part of a floor construction if there exists 5 ft (152 cm) or more of space between the top of the ceiling subsystem and the bottom of the floor or roof above, provided:

(a) The ceiling shall have been tested as a part of a fire-rated assembly in accordance with NFPA 251, Standard Methods of Fire Tests of Building Construction and Materials, for a test period of 1 hour or more, and

(b) Corridor partitions form smoketight joints with the ceilings (joint filler, if used, shall be noncombustible) and,

(c) Each compartment of interstitial space which constitutes a separate smoke area is vented, in case of smoke emergency, to the outside by mechanical means having sufficient capacity to provide at least two air changes per hour, but in no case having a capacity less than 5,000 cfm (2.36 cu m/s), and

(d) The interstitial space shall not be used for storage, and

(e) The space shall not be used as a plenum for supply, exhaust or return air except as noted in (c).

Exception No. 3: Waiting areas on a patient sleeping floor may be open to the corridor, provided:

(a) The area does not exceed 250 sq ft (23.2 sq m), and

(b) The area is located to permit direct supervision by the facility staff, and

(c) The area is equipped with an electrically supervised automatic smoke detection system installed in accordance with 12-3.4, and

(d) Not more than one such waiting area is permitted in each smoke compartment, and

(e) The area is arranged not to obstruct access to required exits.

Exception No. 4: Waiting areas on floors other than health care sleeping floors may be open to the corridor, provided:

(a) Each area does not exceed 600 sq ft (55.7 sq m), and

(b) The area is located to permit direct supervision by the facility staff, and

(c) The area is arranged not to obstruct access to required exits, and

(d) The area is equipped with an electrically supervised, automatic smoke detection system installed in accordance with 12-3.4.

Exception No. 5: Buildings protected throughout by an approved automatic sprinkler system may have spaces which are unlimited in size open to the corridor provided:

(a) The spaces are not used for patient sleeping rooms, treatment rooms or hazardous areas, and

(b) Each space is located to permit direct supervision by the facility staff, and

(c) The space and corridors which the space opens onto in the same smoke compartment are protected by an electrically supervised automatic smoke detection system installed in accordance with 12-3.4, and

(d) The space is arranged not to obstruct access to required exits.

Exception No. 6: Space for doctors' and nurses' charting, communications, and related clerical areas may be open to the corridor.

Exception No. 7: In a supervisory care facility, group meeting or multipurpose therapeutic spaces, other than hazardous areas, under continuous supervision by facility staff may be open to the corridor provided:

(a) Each area does not exceed 1,500 sq ft (140 sq m), and

(b) The area is located to permit direct supervision by the facility staff, and

(c) The area is arranged not to obstruct any access to required exits, and

(d) The area is equipped with an electrically supervised, automatic smoke detection system installed in accordance with 12-3.4, and

(e) Not more than one such space is permitted per smoke compartment.

Exception No. 8: Gift shops protected in accordance with 12-3.2.3.

12-3.6.2 Fixed wired glass vision panels shall be permitted in corridor walls provided they do not exceed 1,296 sq in. (.84 sq m) in area and are mounted in steel or other approved metal frames.

Exception: There shall be no restrictions in area and fire resistance of glass and frames in buildings protected throughout by an approved automatic sprinkler system.

12-3.6.3* Doors protecting corridor openings, in other than required enclosures of exits or hazardous areas, shall be substantial doors, such as 1¾-in. (4.4-cm) solid bonded core wood or of construction that will resist fire for at least 20 minutes. Doors shall be provided with latches suitable for keeping the door closed and acceptable to the authority having jurisdiction. Fixed view panels of wired glass in steel frames or other approved construction shown acceptable by fire test, limited to 1,296 sq in. (.84 sq m) in area, may be installed in these doors.

Exception No. 1: In buildings protected throughout by an approved automatic sprinkler system, the door construction requirements noted above are not required but the doors shall be constructed to resist the passage of smoke. Doors shall be provided with latches suitable for keeping the door closed and acceptable to the authority having jurisdiction.

Exception No. 2: In buildings protected throughout by an approved automatic sprinkler system, there is no restriction on the area of vision panels in such doors, the vision panels do not need to be wired glass, and there is no restriction in the type of frames.

Exception No. 3: Door-closing devices are not required on doors in corridor wall openings other than those serving exits or required enclosures of hazardous area.

Exception No. 4: Labeled door frames are not required providing the door frames and stops are of steel construction or other approved materials complying with the requirements of NFPA 252, Standard Methods of Fire Tests of Door Assemblies. There are no restrictions on door frames in buildings protected throughout by an approved automatic sprinkler system.

Exception No. 5: Doors to toilet rooms, bathrooms, shower rooms, sink closets, and similar auxiliary spaces which do not contain flammable or combustible materials are exempt from these requirements.

12-3.6.4 Dutch doors may be used when they conform to 12-3.6.3 and in addition both 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, rabbet or bevel.

Dutch doors protecting openings in enclosures around hazardous areas shall comply with NFPA 80, *Standard for Fire Doors and Windows.*

12-3.6.5 Transfer grilles, whether or not 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 similary auxiliary spaces which do not contain flammable or combustible materials may have ventilating louvers or may be undercut.*

12-3.7* Subdivision of Building Spaces.

12-3.7.1 Smoke barriers shall be provided, regardless of building construction type, as follows:

(a) To divide every story used by inpatients for sleeping or treatment, or any story having an occupant load of 50 or more persons, regardless of use, into at least two compartments, and

(b) To limit on any story the length and width of each smoke compartment to no more than 150 ft (45 m).

Exception No. 1: Protection may be accomplished in conjunction with the provision of horizontal exits.

Exception No. 2: One dimension may be extended provided that the total width plus length does not exceed 300 ft (91 m) and provided that travel distance from a room to a smoke barrier door or horizontal exit is no more than 150 ft (45 m).

12-3.7.2 Smoke barriers shall be provided on stories which are usable but unoccupied.

12-3.7.3 Any required smoke barrier shall be constructed in accordance with Section 6-3 and shall have a fire resistance rating of at least 1 hour.

Exception: When an atrium is used, smoke barriers may terminate at an atrium wall. A minimum of two separate smoke compartments shall be provided on each floor.

12-3.7.4 At least 30 net sq ft (2.8 sq m) per patient in a hospital or nursing home or 15 net sq ft (1.4 sq m) per resident in a custodial 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 litter

patients or in supervisory care facilities, at least 6 net sq ft (.56 sq m) per occupant shall be provided on each side of the smoke barrier for the total number of occupants in adjoining compartments.

12-3.7.5 Doors in smoke barriers shall be substantial doors such as 1¾-in. (4.4-cm) thick solid bonded wood core or construction that will resist fire for at least 20 minutes. Corridor openings in smoke barriers shall be protected by a pair of swinging doors, each door to swing in a direction opposite from the other. The minimum door leaf width shall be as follows:

(a) Hospitals and nursing homes: 44 in. (112 cm).

(b) Custodial care facilities, hospitals for psychiatric care, supervisory care facilities: 34 in. (86 cm).

* **12-3.7.6** Doors in smoke barriers shall comply with 6-3.3 and shall be self-closing.

Exception: Doors may be held open only if they meet the requirements of 12-2.11.5.

12-3.7.7 Vision panels of approved transparent wired glass not exceeding 1,296 sq in. (.84 sq m) in approved metal frames shall be provided in each door in a smoke barrier.

12-3.7.8 Rabbets, bevels, or astragals are required at the meeting edges, and stops are required at the head and sides of door frames in smoke barriers. Positive latching hardware is not required. Center mullions are prohibited.

Exception: Protection at the meeting edges of doors and stops at the head and sides of door frames may be omitted in buildings equipped with an approved engineered smoke control system. The engineered smoke control system shall respond automatically, preventing the transfer of smoke across the barrier, and shall be designed in accordance with Section 7-3.

12-3.8 Special Features.

12-3.8.1 Every patient sleeping room shall have an outside window or outside door arranged and located so that it can be opened from the inside to permit the venting of products of combustion and to permit any occupant to have direct access to fresh air in case of emergency. (*See 12-1.1.1.7 for detention screen requirements.*) The maximum allowable sill height shall not exceed 36 in. (91 cm) above the floor. Where windows require the use of tools or keys for operation, the tools or keys shall be located on the floor involved at a prominent location accessible to staff.

Exception No. 1: The window sill in special nursing care areas such as those housing ICU, CCU, hemodialysis, and neo-natal patients may be up to 60 in. (152 cm) above the floor.

Exception No. 2: Rooms intended for occupancy of less than 24 hours, such as those housing obstetrical labor beds, recovery beds and observation beds in the emergency department; and newborn nurseries need not comply with this requirement.

Exception No. 3: Windows opening into atriums when the atrium has a smoke removal system are, for the purposes of this requirement, considered outside windows.

Exception No. 4: Buildings designed with approved engineered smoke control systems in accordance with Section 7-3 need not comply with the operable features of this requirement.

SECTION 12-4 SPECIAL PROVISIONS

12-4.1 Windowless Buildings. See Section 30-7 for requirements for windowless buildings.

12-4.2 Operating Features. (*See Chapter 31.*)

SECTION 12-5 BUILDING SERVICES

12-5.1 Utilities.

12-5.1.1 Utilities shall comply with the provisions of Section 7-1.

12-5.1.2 Alarms, emergency communication systems and the illumination of generator set locations shall be as described in the Life Safety Branch of NFPA 70, *National Electrical Code.*

12-5.1.3 Any health care occupancy as indicated within 12-1.1.1.2 which normally utilizes life support devices shall have electrical systems designed and installed in accordance with Chapter 8, "Essential Electrical Systems for Health Care Facilities," of NFPA 99, *Standard for Health Care Facilities.*

Exception: This requirement does not apply to a facility that has life support equipment for emergency purposes only.

12-5.2 Heating, Ventilating, and Air Conditioning.

12-5.2.1 Heating, ventilating, and air conditioning shall comply with the provisions of Section 7-2 and shall be installed in accordance with the manufacturer's specifications.

Exception: As modified in 12-5.2.2 following.

12-5.2.2* Portable space heating devices are prohibited. Any heating device other than a central heating plant shall be so designed and installed that combustible material will not be ignited by it or its appurtenances. If fuel fired, such heating devices shall be chimney or vent connected, shall take air for combustion directly from outside, and shall be so 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 may be used in locations other than means of egress and patient sleeping areas, provided such heaters are located high enough to be out of the reach of persons using the area and provided they are equipped with the safety features called for above.

Exception No. 2.: Fireplaces may be installed and used only in areas other than patient sleeping areas, provided that these areas are separated from patient sleeping spaces by construction having a 1-hour fire resistance rating and they comply with NFPA 211, Standard for Chimneys, Fireplaces and Vents. In addition thereto, the fireplace shall be equipped with a hearth that shall be raised at least 4 in. (10.2 cm), and a heat tempered glass, or other approved material, fireplace enclo-

sure guaranteed against breakage up to a temperature of 650°F (340°C). If, in the opinion of the authority having jurisdiction, special hazards are present, a lock on the enclosure and other safety precautions may be required.

Exception No. 3: Portable space heating devices shall be permitted to be used in nonsleeping staff and employee areas when the heating elements of such a device are limited to not more than 212°F (100°C).

12-5.3 Elevators, dumbwaiters and vertical conveyors shall comply with the provisions of Section 7-4.

12-5.4 Rubbish Chutes, Incinerators, and Laundry Chutes.

12-5.4.1 Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 7-5.

12-5.4.2 Any rubbish chute or linen chute, including pneumatic rubbish and linen systems, shall be provided with automatic extinguishing protection installed in accordance with Section 7-7. (*See Section 7-5.*)

12-5.4.3 Any trash chute shall discharge into a trash collecting room used for no other purpose and protected in accordance with Section 6-4.

12-5.4.4 An incinerator shall not be directly flue-fed nor shall any floor charging chute directly connect with the combustion chamber.

SECTION 12-6 NEW AMBULATORY HEALTH CARE CENTERS

12-6.1 General Requirements.

12-6.1.1 Application.

12-6.1.1.1 Ambulatory health care centers shall comply with the provisions of both Chapter 26 and (this) Section 12-6, as may be more stringent.

12-6.1.1.2 This section establishes life safety requirements, in addition to those required in Chapter 26, for the design of all ambulatory health care centers and outpatient surgical centers which meet the requirements of 12-1.3(e).

12-6.1.2 Reserved.

12-6.1.3 Special Definitions. (*See 12-1.3*)

12-6.1.4 Classification of Occupancy. (*See 12-1.3*)

12-6.1.5 Reserved.

12-6.1.6 Minimum Construction Requirements.

12-6.1.6.1 For purposes of 12-6.1.6, stories shall be counted starting at the primary level of exit discharge and ending at the highest occupiable level. For the purposes of this section, the primary level of exit discharge of a building shall be that floor which is level with or above finished grade of this exterior wall line for 50 percent or more of its perimeter.

12-6.1.6.2 Buildings of one story in height housing ambulatory health care centers may be of Type I, II, III, IV or V construction. (*See 6-2.1.*)

12-6.1.6.3 Buildings of two or more stories in height housing ambulatory health care centers may be of Type I (443), I (332), or II (222), Type II (111), Type III (211), Type IV (2HH) or Type V (111) construction. (*See 6-2.1.*)

Exception: Such buildings may be constructed of Type II (000), III (200) or V (000) if protected throughout by an approved automatic sprinkler system in accordance with Section 7-7.

12-6.1.6.4 Any level below the level of exit discharge shall be separated from the level of exit discharge by at least Type II (111), Type III (211) or Type V (111) construction. (*See 6-2.1.*)

Exception: Such separation is not required for such levels if they are under the contol of the ambulatory health care center and any hazardous spaces are protected in accordance with Section 6-4.

12-6.1.6.5 When new ambulatory health care centers are located in existing buildings, the authority having jurisdiction may accept construction systems of lesser fire resistance than required above if it can be demonstrated to its satisfaction that in cases of fire, prompt evacuation of the center can be made or that the exposing occupancies and materials of construction present no threat of fire penetration from such occupancy into the ambulatory health care center or collapse of the structure.

12-6.1.7 Occupant Load.

12-6.2 Means of Egress Requirements.

12-6.2.1 General. Every aisle, passageway, corridor, exit discharge, exit location and access shall be in accordance with Chapter 5.

Exception No. 1: As modified in the following paragraphs.

Exception No. 2: The requirements of Chapter 5 specifying net clear door width do not apply. Projections into the door opening by stops or by hinge stiles shall be permitted.

12-6.2.2 Types of Exits. Exits shall be restricted to the permissible types described in 26-2.2.

12-6.2.3 Capacity of Means of Egress.

12-6.2.3.1 The capacity of any required means of egress shall be determined in accordance with the provisions of 26-2.3 and shall be based on its width as defined in Section 5-3.

12-6.2.3.2* The minimum width of any corridor or passageway required for exit access shall be 44 in. (112 cm) clear.

12-6.2.3.3* Doors in the means of egress from diagnostic or treatment areas, such as X-ray, surgical or physical therapy, shall be at least 34 in. (86 cm) wide.

12-6.2.4 Number of Exits.

12-6.2.4.1 At least two exits of the types described in 26-2.2 (Business Occupancy) located remote from each other shall be provided for each floor or fire section of the building.

12-6.2.4.2 Any room and any suite of rooms of more than 1,000 sq ft (93 sq m) shall have at least two exit access doors located remote from each other.

12-6.2.5 Arrangement of Means of Egress. (*See 26-2.5.*)

12-6.2.6 Travel Distance to Exits.

12-6.2.6.1 Travel distance shall be measured in accordance with Section 5-6.

12-6.2.6.2 Travel distance:

(a) Between any room door required as exit access and an exit shall not exceed 100 ft (30 m); and

(b) Between any point in a room and an exit shall not exceed 150 ft (45 m).

Exception: The travel distance in (a) or (b) above may be increased by 50 ft (15 m) in buildings protected throughout by an approved automatic sprinkler system.

12-6.2.7 Discharge from Exits. (*See 26-2.7.*)

12-6.2.8 Illumination of Means of Egress. Each ambulatory health care center shall be provided with illumination of means of egress in accordance with Section 5-8.

12-6.2.9 Emergency Lighting and Essential Electrical Systems.

12-6.2.9.1 Each ambulatory health care center shall be provided with emergency lighting in accordance with Section 5-9.

12-6.2.9.2 Where general anesthesia or life support equipment is used, each ambulatory health care center shall be provided with an essential electrical system in accordance with Chapter 8, "Essential Electrical Systems for Health Care Facilities," of NFPA 99, *Standard for Health Care Facilities.*

Exception: Where battery operated equipment is provided and acceptable to the authority having jurisdiction.

12-6.2.10 Marking of Means of Egress. Signs designating exits and ways of travel thereto shall be provided in accordance with Section 5-10.

12-6.2.11 Special Features.

12-6.2.11.1 Special locking arrangements in accordance with 5-2.1.6 are permitted on exterior doors.

12-6.2.11.2 Any door in an exit passageway, horizontal exit, smoke barrier, stairway enclosure, or hazardous area enclosure may be held open only by an automatic release device which complies with 5-2.1.8. The required manual fire alarm system and the systems required by 5-2.1.8(d) shall be arranged so as to initiate the closing action of all such doors by zone or throughout the entire facility.

12-6.2.11.3 Where doors in a stair enclosure are held open by an automatic device as permitted in 12-6.2.11.2, initiation of a door closing action on any level shall cause all doors at all levels in the stair enclosure to close.

12-6.3 Protection.

12-6.3.1 Protection of Vertical Openings. (*See 26-3.1.*)

12-6.3.2 Protection from Hazards. (*See 26-3.2.*)

12-6.3.2.1 Laboratories employing quantities of flammable, combustible, or hazardous materials which are considered as severe hazard shall be protected in accordance with Chapter 7, "Laboratories in Health Related Institutions," of NFPA 99, *Standard for Health Care Facilities.*

12-6.3.2.2 Anesthetizing locations shall be protected in accordance with Chapter 4, "Inhalation Anesthetics in Ambulatory Care Facilities," of NFPA 99, *Standard for Health Care Facilities.*

12-6.3.3 Interior Finish. (*See 26-3.3.*)

12-6.3.4 Detection, Alarm and Communications Systems.

12-6.3.4.1 General. Centers shall be provided with a fire alarm system in accordance with Section 7-6, except as modified below.

12-6.3.4.2 Initiation. Initiation of the required fire alarm systems shall be by manual means, in accordance with 7-6.2, and by means of any detection devices or detection systems required.

12-6.3.4.3 Occupant Notification. Occupant notification shall be accomplished automatically, without delay, upon operation of any fire alarm activating device by means of an internal audible general alarm in accordance with 7-6.3.

Exception No. 1: The presignal system allowed by the Exception to 7-6.3.2 shall not be permitted.

Exception No. 2: Zoned, coded systems shall be permitted.

12-6.3.4.4 Emergency Forces Notification. Fire department notification shall be accomplished in accordance with 7-6.4.

12-6.3.4.5 Emergency Control. Operation of any activating device in the required fire alarm system shall be arranged to automatically accomplish, without delay, any control functions required to be performed by that device (*see 7-6.5*).

12-6.3.5 Extinguishment Requirements. (*See 26-3.5.*)

12-6.3.5.1 The sprinkler piping, serving no more than six sprinklers for any isolated hazardous area, may be connected directly to a domestic water supply system having a capacity sufficient to provide 0.15 gal per minute per sq ft (6.1 L/min/sq m) 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. When more than two sprinklers are installed in a single area, water flow detection shall be provided to sound the building fire alarm, or notify by a signal any constantly attended location such as PBX, security, or emergency room, whereby necessary corrective action shall be directed.

12-6.3.5.2 Portable fire extinguishers shall be provided in ambulatory health care occupancies in accordance with 7-7.4.1.

12-6.3.6 Corridors. (*See 26-3.6.*)

12-6.3.7 Subdivision of Building Space.

12-6.3.7.1 Ambulatory health care occupancies shall be separated from other tenants and occupancies by walls having at least 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 at least 1¾-in. (4.4-cm) solid bonded wood core or the equivalent and equipped with positive latches. These doors shall be self-closing and normally kept in the closed position except when in use. Any vision panels shall be of fixed wired glass set in approved metal frames and limited in size to 1,296 sq in. (.84 sq m).

12-6.3.7.2 The ambulatory health care facility shall be divided into at least two smoke compartments on patient treatment floors.

Exception: Facilities less than 2,000 sq ft (185 sq m) and protected by an approved automatic smoke detection system need not be divided.

12-6.3.7.3 Any required smoke barrier shall be constructed in accordance with Section 6-3 and shall have a fire resistance rating of at least 1 hour.

12-6.3.7.4 Vision panels in the smoke barrier shall be of fixed wired glass set in approved metal frames and shall be limited in size to 1,296 sq in. (.84 sq m).

12-6.3.7.5 At least 15 net sq ft (1.4 sq m) 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. The length and width of each smoke compartment shall be limited to no more than 150 ft (45 m).

Exception: One dimension may be extended provided that the total width plus length does not exceed 300 ft (91 m) and provided that travel distance from a room door to smoke barrier door or horizontal exit is not more than 150 ft (45 m).

12-6.3.7.6 Doors in smoke barriers shall be at least 1¾-in. (4.4-cm) solid bonded wood core or the equivalent and shall be self-closing. A vision panel is required.

12-6.3.7.7 Doors in smoke barriers shall normally be kept closed or if held open, they shall be equipped with automatic devices which will release the doors upon activation of:

(a) The fire alarm system, and either

(b) A local smoke detector, or,

(c) A complete automatic fire extinguishing system or complete automatic fire detection system.

12-6.4 Special Provisions. (*See Section 26-4.*)

12-6.5 Building Services.

12-6.5.1 Utilities. Utilities shall comply with the provisions of Section 7-1.

12-6.5.2 Heating, Ventilating and Air Conditioning.

12-6.5.2.1 Heating, ventilating and air conditioning shall comply with the provisions of Section 7-2 and shall be installed in accordance with the manufacturer's specifications.

Exception: As modified in 12-6.5.2.2 following.

12-6.5.2.2* Portable space heating devices are prohibited. Any heating device other than a central heating plant shall be so designed and installed that combustible material will not be ignited by it or its appurtenances. If fuel fired, such heating devices shall be chimney or vent connected, shall take air for combustion directly from the outside, and shall be so 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 may be used in locations other than means of egress and patient treatment areas, provided such heaters are located high enough to be out of the reach of persons using the area and provided they are equipped with the safety features called for above.

Exception No. 2: Portable space heating devices shall be permitted to be used in nonsleeping staff and employee areas when the heating elements of such a device are limited to not more than 212°F (100°C).

12-6.5.3 Elevators, dumbwaiters and vertical conveyors shall comply with the provisions of Section 7-4.

12-6.5.4 Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 7-5.

CHAPTER 13 EXISTING HEALTH CARE OCCUPANCIES

(See also Chapter 31.)

SECTION 13-1 GENERAL REQUIREMENTS

13-1.1 Application. *(See also Section 1-4.)*

13-1.1.1 General.

13-1.1.1.1 Existing health care facilities shall comply with the provisions of this chapter. *(See Chapter 31 for operating features.)*

Exception: Hospitals and nursing homes found to have equivalent safety. One such method for determining this equivalency is given in Appendix C.*

13-1.1.1.2 This chapter establishes life safety requirements for all existing hospitals, nursing homes, custodial care and supervisory care facilities. Where requirements vary, the specific occupancy is named in the paragraph pertaining thereto. Section 13-6 establishes life safety requirements for all existing ambulatory health care centers.

13-1.1.1.3 Health care occupancies are those used for purposes such as medical or other treatment or care of persons suffering from physical or mental illness, disease or infirmity; for the care of infants, convalescents or infirm aged persons.

13-1.1.1.4 Health care facilities provide sleeping accommodations for the occupants and are occupied by persons who are mostly incapable of self-preservation because of age, physical or mental disability, or because of security measures not under the occupants' control.

13-1.1.1.5 This chapter also covers ambulatory health care centers as defined in 13-1.3(e). See Section 13-6 for requirements.

13-1.1.1.6* Buildings or sections of buildings which house, or in which care is rendered to patients, who are capable of judgment and appropriate physical action for self-preservation under emergency conditions in the opinion of the governing body of the facility and the governmental agency having jurisdiction may come under other chapters of the *Code* instead of Chapter 13.

13-1.1.1.7 It shall be recognized that, in buildings housing certain types of patients or having detention rooms or a security section, it may 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* which would otherwise require the keeping of exits unlocked.

13-1.1.1.8 It shall be also recognized that some mental health patients are not capable of seeking safety without guidance.

13-1.1.1.9 Buildings or sections of buildings which house older persons and which provide activities that foster continued independence but do not include those services distinctive to health care facilities [as defined in 13-1.3(c)] may be subject to the requirements of other sections of this *Code*, such as Chapters 19 or 21.

13-1.1.1.10 Health care occupancies shall include all buildings or parts thereof with occupancy as described in this chapter under Special Definitions, 13-1.3.

13-1.1.2* Objective. The objective of this chapter is to provide a reasonable level of safety by reducing the probability of injury and loss of life from the effects of fire 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.

13-1.1.3. Total Concept. All health care facilities shall be so designed, constructed, maintained, and operated as to minimize the possibility of a fire emergency requiring the evacuation of occupants. Because the safety of health care occupants cannot be assured adequately by dependence on evacuation of the building, their protection from fire shall be provided by appropriate arrangement of facilities, adequate staffing, and careful development of operating and maintenance procedures composed of the following:

(a) Proper design, construction, and compartmentation; and

(b) Provision for detection, alarm, and extinguishment; and

(c) Fire prevention and the planning, training, and drilling in programs for the isolation of fire, transfer of occupants to areas of refuge, or evacuation of the building.

13-1.1.4 Additions, Conversions, Modernization, Renovation, and Construction Operations. *(See also 1-4.5 and 1-4.6.)*

13-1.1.4.1 Additions shall be separated from any existing structure not conforming to the provisions within Chapter 13 by a fire barrier having at least a 2-hour fire resistance rating constructed of materials as required for the addition.

13-1.1.4.2 Communicating openings in dividing fire barriers required by 13-1.1.4.1 shall occur only in corridors and shall be protected by approved self-closing fire doors. *(See also Section 6-2.)*

13-1.1.4.3 Doors in barriers required by 13-1.1.4.1 shall normally be kept closed.

Exception: Doors may be held open only if they meet the requirements of 13-2.11.5.

13-1.1.4.4* Conversions. Conversions shall comply with 1-6.4.

13-1.1.4.5 Construction Operations. See 1-6.3 and Chapter 31 for life safety provisions during construction.

13-1.1.5 Modification of Retroactive Provisions. *(See also Sections 1-4 and 1-5.)*

13-1.1.5.1 The requirements of this chapter may be modified if their application clearly would be impractical in the judgment of the authority having jurisdiction and if the resulting arrangement could be considered as presenting minimum hazard to the life safety of the occupants. The

requirements may be modified by the authority having jurisdiction to allow alternative arrangements that will secure as nearly equivalent safety to life from fire as practical.

13-1.2 Mixed Occupancies. (*See also 1-4.7.*)

13-1.2.1* Sections of health care facilities may be classified as other occupancies if they meet all of the following conditions:

(a) They are not intended to serve health care occupants for purposes of

1. Housing, or

2. Treatment, or

3. Customary access by patients incapable of self-preservation.

(b) They are adequately separated from areas of health care occupancies by construction having a fire resistance rating of at least 2 hours.

13-1.2.2 Ambulatory care (*see Section 13-6*), medical clinics and similar facilities which are contiguous to health care occupancies but are primarily intended to provide outpatient services may be classified as a business or ambulatory care occupancy provided the facilities are separated from health care occupancies by not less than 2-hour fire-resistive construction.

Exception: When the business occupancy or similar facility is intended to provide:*

(a) Services for hospital patients who are litter borne, or,

(b) General anesthesia services,

the section shall meet all requirements for health care facilities.

13-1.2.3 Health care occupancies in buildings housing other occupancies shall be completely separated from them by construction having a fire resistance rating of at least 2 hours; as provided for additions in 13-1.1.4.

13-1.2.4 All means of egress from health care occupancies that traverse non-health care spaces shall conform to requirements of this *Code* for health care occupancies.

Exception: It is permissible to exit through a horizontal exit into other contiguous occupancies which do not conform with health care egress provisions but which do comply with requirements set forth in the appropriate occupancy chapter of this Code, as long as the occupancy does not have high hazard contents. The horizontal exit must comply with the requirements of 13-2.2.4.

13-1.2.5 Auditoriums, chapels, staff residential areas or other occupancies provided in connection with health care facilities shall have exits provided in accordance with other applicable sections of the *Code*.

13-1.2.6 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 13-3.2.

13-1.2.7 Non-health care related occupancies classified as containing high hazard contents shall not be permitted in buildings housing health care occupancies.

13-1.3 Special Definitions.

(a) **Hospital.** A building or part thereof used for the medical, psychiatric, obstetrical or surgical care, on a 24-hour basis, of four or more inpatients. Hospital, wherever used in this *Code*, shall include general hospitals, hospitals for psychiatric care, tuberculosis hospitals, children's hospitals, and any such facilities providing inpatient care.

(b) **Nursing Home.** A building or part thereof used for the housing and nursing care, on a 24-hour basis, of four or more persons who, because of mental or physical incapacity, may be unable to provide for their own needs and safety without the assistance of another person. 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.

(c) **Custodial Care Facility.** A building, or part thereof, used for the housing, on a 24-hour basis, of four or more persons who are incapable of self-preservation because of age or physical or mental limitation. The following types of facilities, when accommodating persons of the above description, shall be classified as custodial care facilities:

1. Nursery facilities that provide full-time care for children under 6 years of age.

2. Facilities for the care of the mentally retarded that normally provide housing and custodial care on a 24-hour basis in an institutional setting such as a hospital or institution for the mentally retarded.

Facilities housing older persons or mental patients, including the mentally retarded, who are judged to be capable of evacuating the building with staff assistance in an emergency, are covered by other chapters of the *Code* (*see 13-1.1.1.6 and 13-1.1.1.9*).

Facilities that do not provide housing on a 24-hour basis for their occupants are classified as Day-Care Centers, Group Day-Care Centers, or Family Day-Care Homes.

(d)* **Supervisory Care Facility.** A building or part thereof used for the housing, on a 24-hour basis, of four or more mental health patients who are capable of self-preservation and who require supervison and who are receiving therapy, training or other health related care and who may have imposed upon them security measures not under their control.

(c) **Ambulatory Health Care Centers.** A building or part thereof used to provide services or treatment to four or more patients at the same time and meeting either (1) or (2) below.

1. Those facilities which provide, on an outpatient basis, treatment for patients which would render them incapable of taking action for self-preservation under emergency conditions without assistance from others, such as hemodialysis units or freestanding emergency medical units.

2. Those facilities which provide, on an outpatient basis, surgical treatment requiring general anesthesia.

13-1.4 Classification of Occupancy. See Definitions, 13-1.3.

13-1.5 Classification of Hazard of Contents. The classification of hazard of contents shall be as defined in Section 4-2.

13-1.6 Minimum Construction Requirements.

13-1.6.1 For the purpose of 13-1.6, stories shall be counted starting at the primary level of exit discharge and ending at the

highest occupiable level. For the purposes of this section, the primary level of exit discharge of a building shall be that floor which 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 a building.

13-1.6.2 Health care occupancies shall be limited to the following types of building construction (*see 6-2.1*):

Construction Type	Stories			
	1	2	3	over 3
I (443) I (332) II (222)	X	X	X	X
II (111)	X	X†	X†	N.P.
II (000)	X†	X†	N.P.	N.P.
IV (2HH)	X†	X†	N.P.	N.P.
III (211)	X†	X†	N.P.	N.P.
V (111)	X†	X†	N.P.	N.P.
III (200)	X†	N.P.	N.P.	N.P.
V (000)	X†	N.P.	N.P.	N.P.

X = Permitted type of construction
X† = Building requires automatic sprinkler protection (*See 13-3.5.1*)
N.P. = Not Permitted

Exception: Any building of Type I or Type II (222 or 111) construction may include roofing systems involving combustible supports, decking, or roofing provided: (1) the roof covering meets Class C requirements in accordance with NFPA 256, Fire Tests for Roof Coverings, and (2) the roof is separated from all occupied portions of the building by a noncombustible floor assembly which includes at least 2½ in. (6.4 cm) of concrete or gypsum fill. To qualify for this exception, the attic or other space so developed shall either be unoccupied or protected throughout by an approved automatic sprinkler system.

13-1.6.3 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 may be used within non-load bearing 1-hour fire-rated partitions.

13-1.6.4* Openings for the passage of pipes or conduit in walls or partitions that are required to have fire or smoke resisting capability shall be protected in accordance with 6-2.2.8 or 6-3.5.1.

13-1.6.5 Firestopping. Each exterior wall of frame construction and interior stud partitions shall be firestopped so as 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 at least 2 in. (5 cm) (nominal) thick, or of suitable noncombustible material.

13-1.7 Occupant Load. The occupant load for which means of egress shall be provided for any floor shall be the maximum number of persons intended to occupy that floor, but not less than one person for each 120 sq ft (11.1 sq m) gross floor area in health care sleeping departments and not less than one person for each 240 sq ft (22.3 sq m) of gross floor area of inpatient health care treatment departments. Gross floor areas shall be measured within the exterior building walls with no deductions. (*See Chapter 3.*)

SECTION 13-2 MEANS OF EGRESS REQUIREMENTS

13-2.1 General. Every aisle, passageway, corridor, exit discharge, exit location and access shall be in accordance with Chapter 5.

Exception: As modified in the following paragraphs.

13-2.2 Types of Exits. Exits shall be restricted to the permissible types described in 13-2.2.1 through 13-2.2.6.

13-2.2.1 Doors Leading Directly Outside the Building. (*See 5-2.1.*)

13-2.2.2 Class A or B Stairs. (*See 5-2.2.*)

13-2.2.3 Smokeproof Enclosures. (*See 5-2.3.*)

13-2.2.4 Horizontal Exits. A horizontal exit shall be in conformance with 5-2.4, modified as below:

(a) At least 30 net sq ft (2.8 sq m) per patient in a hospital or nursing home or 15 net sq ft (1.4 sq m) per resident in a custodial 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 horizontal exit. On stories not housing bed or litter patients, or in supervisory care facilities, at least 6 net sq ft (.56 sq m) per occupant shall be provided on each side of the horizontal exit for the total number of occupants in adjoining compartments.

(b)* A door in a horizontal exit is not required to swing with exit travel as specified in 5-2.4.3.3.

(c) The total exit capacity of the other exits (stairs, ramps, doors leading outside the building) shall not be reduced below one-third that required for the entire area of the building.

13-2.2.5 Class A or B Ramps. (*See 5-2.5.*) Ramp width shall be as specified in 13-2.3.3.

13-2.2.6 Exit Passageways. (*See 5-2.6.*)

13-2.3 Capacity of Means of Egress.

13-2.3.1 The capacity of any required means of egress shall be based on its width as defined in Section 5-3.

13-2.3.2 The capacity of means of egress providing travel by means of stairs shall be 22 persons per exit unit; and the capacity of means of egress providing horizontal travel (without stairs); such as doors, ramps, or horizontal exits, shall be 30 persons per exit unit.

Exception: The capacity of means of egress in health care occupancies protected throughout by an approved automatic sprinkler system may be increased to 35 persons per exit unit

for travel by means of stairs, and to 45 persons per exit unit for horizontal travel without stairs.

13-2.3.3 Any required aisle, corridor, or ramp shall be not less than 48 in. (122 cm) in clear width when serving as means of egress from patient sleeping rooms. It shall be so arranged as to avoid any obstructions to the convenient removal of nonambulatory persons carried on stretchers or on mattresses serving as stretchers.

13-2.3.4* The minimum width for evacuation purposes only for doors in the means of egress from hospital, nursing home and custodial sleeping rooms, diagnostic and treatment areas, such as X-ray, surgery, or physical therapy, shall be at least 34 in. (86 cm) wide.

13-2.4 Number of Exits.

13-2.4.1 At least two exits of the types described in 13-2.2.1 through 13-2.2.6, located remotely from each other, shall be provided for each floor or fire section of the building.

13-2.4.2 At least one exit from each floor or fire section shall be either:

(a) A door leading directly outside the building, or

(b) A stair, or

(c) A smokeproof enclosure, or

(d) A ramp, or

(e) An exit passageway.

Any fire section not meeting these requirements shall be considered as part of an adjoining zone. Egress shall not require return through the zone of fire origin.

13-2.4.3* At least two exits of the types described in 13-2.2.1 through 13-2.2.6 shall be accessible from each smoke compartment. Egress may be through adjacent compartment(s), but shall not require return through the compartment of fire origin.

13-2.5 Arrangement of Means of Egress.

13-2.5.1 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: For patient sleeping rooms, one adjacent room, such as a sitting or anteroom, may intervene if the intervening room is not used to serve as an exit access for more than eight patient sleeping beds.

Exception No. 3: Exception No. 2 above shall apply to special nursing suites permitted in 13-2.5.3 and suites in supervisory care facilities without being limited to eight beds or basinettes.

Exception No. 4: For rooms other than patient sleeping rooms, one or more adjacent rooms, such as offices, work rooms, etc., may intervene provided that such intervening rooms are not hazardous areas as defined in 13-3.2.

13-2.5.2 Any patient sleeping room, or any suite which includes patient sleeping rooms, of more than 1,000 sq ft (93 sq m) shall have at least two exit access doors remote from each other.

Any room or any suite of rooms, other than patient sleeping rooms, of more than 2,500 sq ft (230 sq m) shall have at least two exit access doors remote from each other.

13-2.5.3 Any patient sleeping room which complies with the requirements previously set forth in this section may be subdivided with non-fire-rated, noncombustible or limited-combustible partitions, provided that the arrangement allows for direct and constant visual supervision by nursing personnel. Rooms which are so subdivided shall not exceed 5,000 sq ft (460 sq m).

Exception: In supervisory care facilities, such spaces continuously monitored by staff do not require direct visual supervision providing the space is equipped with an electrically supervised smoke detection system.

13-2.5.4 Any suite of rooms other than patient sleeping rooms, which complies with the requirements previously set forth in this section, may be subdivided with non-fire-rated, noncombustible or limited-combustible partitions. Such suites shall not exceed 10,000 sq ft (930 sq m) in area and either:

(a) The maximum travel distance from any point in the suite to a corridor door is limited to 50 ft (15 m), or

(b) There is unrestricted access from patient treatment areas to a corridor with a maximum of one intervening room.

13-2.5.5* Every corridor shall provide access to at least two approved exits in accordance with Sections 5-4 and 5-5 without passing through any intervening rooms or spaces other than corridors or lobbies.

Exception: Existing dead-end corridors may be continued in use if it is not practical and feasible to alter them so that exits will be accessible in at least two different directions from all points in aisles, passageways and corridors.

13-2.6 Travel Distance to Exits.

13-2.6.1 Travel distance shall be measured in accordance with Section 5-6.

13-2.6.2 Travel distance:

(a) Between any room door required as exit access and an exit shall not exceed 100 ft (30 m);

(b) Between any point in a room and an exit shall not exceed 150 ft (45 m);

Exception: The travel distance in (a) or (b) above may be increased by 50 ft (15 m) in buildings protected throughout by an approved automatic sprinkler system.

(c) Between any point in a health care sleeping room and an exit access door of that room shall not exceed 50 ft (15 m).

(d) Between any point in a suite of rooms as permitted by 13-2.5 and an exit access door of that suite shall not exceed 100 ft (30 m) and meeting (b) above.

13-2.7 Discharge from Exits. (*See Section 5-7.*)

13-2.7.1 The exit discharge shall be arranged and marked to make clear the direction of egress. Required exit stairs that continue beyond the level of discharge shall be interrupted at the level of discharge by partitions, doors, physical barriers, or other effective means.

13-2.7.2 A maximum of 50 percent of the exits may discharge through areas on the floor of exit discharge in accordance with 5-7.2.

13-2.8 Illumination of Means of Egress.

13-2.8.1 Each facility as indicated within 13-1.1.1.2 shall be provided with illumination of means of egress in accordance with Section 5-8.

13-2.9 Emergency Lighting.

13-2.9.1 Each facility as indicated within 13-1.1.1.2 shall be provided with emergency lighting in accordance with Section 5-9.

Exception: Emergency lighting of at least 1-hour duration shall be provided.

13-2.10 Marking of Means of Egress.

13-2.10.1 Each facility as indicated within 13-1.1.1.2 shall be provided with exit marking in accordance with Section 5-10.

Exception: Where the line of exit travel is obvious signs may be omitted in one story buildings with an occupancy of less than 30 persons.

13-2.11 Special Features.

13-2.11.1 Locks shall not be permitted on patient sleeping room doors.

Exception No. 1: Key locking devices which restrict access to the room from the corridor and which are operable only by staff from the corridor side may be permitted. Such devices shall not restrict egress from the room.

Exception No. 2: Doors in homes for the aged may be lockable by the occupant, if they can be unlocked from the opposite side and keys are carried by attendants at all times. (See also 5-2.1.5.1 and 5-2.1.5.3.)

Exception No. 3: Door locking arrangements are permitted in mental health facilities. (See 13-1.1.1.7 and 13-2.11.4.)

13-2.11.2 Doors not in a required means of egress may be subject to locking.

13-2.11.3 Doors within a required means of egress shall not be equipped with a latch or lock which requires the use of a tool or key from the egress side.

Exception No. 1: Door locking arrangements are permitted in mental health facilities. (See 13-1.1.1.7 and 13-2.11.4.)

Exception No. 2: Special locking arrangements in accordance with 5-2.1.6 are permitted on exterior doors.

13-2.11.4 In buildings in which doors are locked, provisions shall be made for the rapid removal of occupants by such reliable means as the remote control of locks or by keying all locks to keys readily available to staff who are in constant attendance.

13-2.11.5* Any door in an exit passageway, stairway enclosure, horizontal exit, smoke barrier, or hazardous area enclosure may be held open only by an automatic release device which complies with 5-2.1.8. The required manual fire alarm system and the systems required by 5-2.1.8(d) shall be arranged so as to initiate the closing action of all such doors by zone or throughout the entire facility.

13-2.11.6 Where doors in a stair enclosure are held open by an automatic device as permitted in 13-2.11.4, initiation of a door closing action on any level shall cause all doors at all levels in the stair enclosure to close.

13-2.11.7* Health care occupancies are exempted from the provisions of 5-2.1.5.2.

SECTION 13-3 PROTECTION

13-3.1 Protection of Vertical Openings.

13-3.1.1 Any stairway, ramp, elevator hoistway, light or ventilation shaft, chute, and other vertical opening between stories shall be enclosed in accordance with Section 6-2.2 with construction having a 1-hour fire resistance rating.

Exception No. 1: Where a full enclosure of a stairway that is not a required exit is impracticable, the required enclosure may be limited to that necessary to prevent a fire originating in any story from spreading to any other story.

Exception No. 2: Stairs that do not connect to a corridor, do not connect more than two levels, and do not serve as a means of egress need not comply with these regulations.

Exception No. 3: Floor and ceiling openings for pipes or conduits when the opening around the pipes or conduits is sealed in an approved manner. (See 6-2.2.8.)*

Exception No. 4: An atrium may be utilized in accordance with 6-2.2.3.5.

13-3.1.2 A door in a stair enclosure shall be self-closing, shall normally be kept in a closed position and shall be marked in accordance with 5-10.4.2.

Exception: Doors in stair enclosures may be held open under the conditions specified by 13-2.11.5 and 13-2.11.6.

13-3.2 Protection from Hazards.

13-3.2.1 Any hazardous areas shall be safeguarded by a fire barrier of 1-hour fire resistance rating or provided with an automatic extinguishing system in accordance with 6-4.1. Hazardous areas include, but are not restricted to, the following:

Boiler and heater rooms
Laundries
Repair shops
Handicraft shops
Employee locker rooms
Soiled linen rooms
Paint shops
Trash collection rooms
Rooms or spaces, including repair shops, used for storage of combustible supplies and equipment in quantities deemed hazardous by the authority having jurisdiction.
Laboratories employing quantities of flammable or combustible materials less than that which would be considered severe.

13-3.2.2* Laboratories employing quantities of flammable, combustible, or hazardous materials which are considered as severe hazard shall be protected in accordance with Chapter 7, "Laboratories in Health-Related Institutions," of NFPA 99, *Standard for Health Care Facilities*.

13-3.2.3 Gift Shops. Gift shops shall be protected as hazardous areas when used for the storage or display of combustibles

in quantities considered hazardous. Gift shops not considered hazardous and having separately protected storage may be:

(a) Open to a lobby if the gift shop is not greater than 500 sq ft (46.5 sq m) and is protected throughout by an approved automatic sprinkler system, or

(b) Separated from a lobby with non-fire-rated walls if the gift shop is protected throughout by an approved automatic sprinkler system, or

(c) Separated from corridors by non-fire-rated walls if the gift shop is protected throughout by an approved automatic sprinkler system.

13-3.2.4 Cooking facilities shall be protected in accordance with 7-2.3.

Exception: Where domestic cooking equipment is used for food warming or limited cooking, protection or segregation of food preparation facilities is not required.*

13-3.3* Interior Finish.

13-3.3.1 Interior finish on walls and ceilings throughout shall be Class A or Class B, in accordance with Section 6-5.

Exception: In buildings protected throughout by an approved automatic sprinkler system, Class C interior finish may be continued in use on all walls and ceilings within rooms separated in accordance with 13-3.6 from the exit access corridors.

13-3.3.2 Newly installed interior floor finish in corridors and exits shall be Class I in accordance with Section 6-5. No restrictions shall apply to existing interior floor finish.

13-3.4 Detection, Alarm and Communications Systems.

13-3.4.1 General. Health care occupancies shall be provided with a fire alarm system in accordance with Section 7-6.

13-3.4.2 Initiation. Initiation of the required fire alarm systems shall be by manual means, in accordance with 7-6.2, and by means of any detection devices or detection systems required.

Exception No. 1: Fire alarm pull stations in patient sleeping areas may be omitted at exits if located at all nurses' control stations or other continuously attended staff location, provided such pull stations are visible and continuously accessible and that travel distances of 7-6.2.4 are not exceeded.

Exception No. 2: Fixed extinguishing systems protecting commercial cooking equipment in kitchens that are protected by a complete automatic sprinkler system need not initiate the fire alarm system.

13-3.4.3 Notification.

13-3.4.3.1 Occupant Notification. Occupant notification shall be accomplished automatically, without delay, upon operation of any fire alarm activating device by means of an internal audible general alarm in accordance with 7-6.3. Presignal systems are prohibited.

Exception No. 1: Zoned, coded systems shall be permitted.

Exception No. 2: Where visual devices have been installed in patient sleeping areas, in place of the audible alarm, they may be accepted by the authority having jurisdiction.

13-3.4.3.2 Emergency Forces Notification. Fire department notification shall be accomplished in accordance with 7-6.4.

13-3.4.4 Emergency Control. Operation of any activating device in the required fire alarm system shall be arranged to automatically accomplish, without delay, any control functions to be performed by that device (*see 7-6.5*).

13-3.4.5 Detection. An approved automatic smoke detection system shall be installed in all corridors of custodial care and supervisory care facilities. Such systems shall be installed in accordance with Section 7-6, but in no case shall smoke detectors be spaced further apart than 30 ft (9.1 m) on centers or more than 15 ft (4.5 m) from any wall.

Exception No. 1: Where each patient sleeping room is protected by such an approved detection system and a local detector is provided at the smoke barrier and horizontal exits, such corridor systems will not be required on the patient sleeping room floors.

Exception No. 2: Buildings protected throughout by an approved automatic sprinkler system installed in accordance with Section 7-7.

13-3.5 Extinguishment Requirements.

13-3.5.1 All health care facilities shall be protected throughout by an approved automatic sprinkler system. (*See 13-1.6 for construction types permitted.*)

Exception: Buildings of Type I (443), I (332) or II (222) construction of any height or Type II (111) construction not over one story in height.

13-3.5.2 Where exceptions are stated in the provisions of the *Code* for health care occupancies protected throughout by an approved automatic sprinkler system, and where such systems are required, the systems shall be in complete accordance with Section 7-7 for systems in light hazard occupancies and shall be electrically interconnected with the fire alarm system.

13-3.5.3 The main sprinkler control valve(s) shall be electrically supervised so that at least a local alarm will sound at a constantly attended location when the valve is closed.

13-3.5.4 Sprinkler piping serving not more than six sprinklers for any isolated hazardous area may be connected directly to a domestic water supply system having a capacity sufficient to provide 0.15 gal per minute per sq ft (6.1 L/min/sq m) of floor area throughout the entire enclosed area. An indicating shut-off valve shall be installed in an accessible location between the sprinklers and the connection to the domestic water supply. For new installations in existing buildings, when more than two sprinklers are installed in a single area, water flow detection shall be provided to sound the building fire alarm, or notify by a signal any constantly attended location such as PBX, security, or emergency room, whereby necessary corrective action shall be directed.

13-3.5.5 Portable fire extinguishers shall be provided in all health care occupancies in accordance with 7-7.4.1.

13-3.6 Construction of Corridor Walls.

13-3.6.1* Corridors shall be separated from all other areas by partitions. Such partitions shall be continuous from the floor slab to the underside of the roof or floor slab above, through any concealed spaces such as those above the suspended ceilings, and through interstitial structural and mechanical spaces, and shall have a fire resistance rating of at least 20 minutes.

Exception No. 1: In health care occupancies protected throughout by an approved automatic sprinkler system, a corridor may be separated from all other areas by non-fire-rated partitions, and where suspended ceilings are provided, the partitions may be terminated at the suspended ceiling.

Exception No. 2: Corridor partitions may terminate at ceilings which are not an integral part of a floor construction if there exists 5 ft (152 cm) or more of space between the top of the ceiling subsystem and the bottom of the floor or roof above, provided:

(a) The ceiling shall have been tested as a part of a fire-rated assembly in accordance with NFPA 251, Standard Methods of Fire Tests of Building Construction and Materials, for a test period of 1 hour or more, and

(b) Corridor partitions form smoketight joints with the ceilings (joint filler, if used, shall be noncombustible), and

(c) Each compartment of interstitial space which constitutes a separate smoke area is vented, in case of smoke emergency, to the outside by mechanical means having sufficient capacity to provide at least two air changes per hour, but in no case having a capacity less than 5,000 cfm (2.36 cu m/s), and

(d) The interstitial space shall not be used for storage, and

(e) The space shall not be used as a plenum for supply, exhaust or return air except as noted in (c).

Exception No. 3: Waiting areas may be open to the corridor, provided:

(a) Each area does not exceed 600 sq ft (55.7 sq m), and

(b) The area is located to permit direct supervision by the facility staff, and

(c) The area is arranged not to obstruct any access to required exits, and

(d) The area is equipped with an electrically supervised, automatic smoke detection system installed in accordance with 13-3.4.

Exception No. 4: Spaces other than patient sleeping rooms, treatment rooms and hazardous areas may be open to the corridor and may be unlimited in area provided:

(a) Each space is located to permit direct supervision by the facility staff, and

(b) The space and corridors which the space opens onto in the same smoke compartment are protected by an electrically supervised automatic smoke detection system installed in accordance with 13-3.4, and

(c) Each space is protected by automatic sprinklers or the furnishings and furniture in combination with all other combustibles within the area are of such a minimum quantity and are so arranged that a fully developed fire is unlikely to occur, and

(d) The space is arranged not to obstruct access to required exits.

Exception No. 5: Corridor partitions may terminate at monolithic ceilings which are designed and constructed to resist the passage of smoke and there is a smoketight joint between the top of the partition and the bottom of the ceiling.

Exception No. 6: Space for doctors' and nurses' charting, communications, and related clerical areas may be open to the corridor.

Exception No. 7: In a supervisory care facility, group meeting or multipurpose therapeutic spaces, other than hazardous areas, under continuous supervision by facility staff may be open to the corridor provided:

(a) Each area does not exceed 1,500 sq ft (140 sq m), and

(b) The area is located to permit direct supervision by the facility staff, and

(c) The area is arranged not to obstruct any access to required exits, and

(d) The area is equipped with an electrically supervised, automatic smoke detection system installed in accordance with 13-3.4, and

(e) Not more than one such space is permitted per smoke compartment.

Exception No. 8: Gift shops protected in accordance with 13-3.2.3.

13-3.6.2 Fixed wired glass vision panels shall be permitted in corridor walls provided they do not exceed 1,296 sq in. (.84 sq m) in area and are mounted in steel or other approved metal frames.

Exception: There shall be no restrictions in area and fire resistance of glass and frames in buildings protected throughout by an approved automatic sprinkler system.

13-3.6.3* Doors protecting corridor openings, in other than required enclosures of exits or hazardous areas, shall be substantial doors, such as 1¾-in. (4.4-cm) solid bonded core wood or of construction that will resist fire for at least 20 minutes. Doors shall be provided with means suitable for keeping the door closed and acceptable to the authority having jurisdiction. Fixed view panels of wired glass in approved steel frames, or other approved construction shown acceptable by fire test, limited to 1,296 sq in. (.84 sq m) in area, may be installed in these doors.

Exception No. 1: In buildings protected throughout by an approved automatic sprinkler system, the door construction requirements noted above are not required but the doors shall be constructed to resist the passage of smoke. Doors shall be provided with means suitable for keeping the door closed and acceptable to the authority having jurisdiction.

Exception No. 2: In buildings protected throughout by an approved automatic sprinkler system, there is no restriction on the area of the vision panels in such doors, and the vision panels do not need to be wired glass, and there is no restriction in the type of frames.

Exception No. 3: Door-closing devices are not required on doors in corridor wall openings other than those serving exits or required enclosure of hazardous areas.

Exception No. 4: Labeled door frames are not required providing the door frames and stops are of steel construction or other approved materials complying with the requirements of NFPA 252, Standard Methods of Fire Tests of Door Assemblies. There are no restrictions on door frames in buildings protected throughout by an approved automatic sprinkler system.

Exception No. 5: Doors to toilet rooms, bathrooms, shower rooms, sink closets and similar auxiliary spaces which do not contain flammable or combustible materials are exempt from these requirements.

13-3.6.4 Dutch doors may be used when they conform to 13-3.6.3 and in addition both 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, rabbet or bevel.

Dutch doors protecting openings in enclosures around hazardous areas shall comply with NFPA 80, *Standard for Fire Doors and Windows.*

13-3.6.5 Transfer grilles, whether or not 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 which do not contain flammable or combustible materials may have ventilating louvers or may be undercut.*

13-3.7 Subdivision of Building Spaces.

13-3.7.1 Smoke barriers shall be provided, regardless of building construction, as follows:

(a) To divide every story, used for sleeping rooms for more than 30 health care occupants, into at least two compartments, and

(b) To limit on any story the maximum area of each smoke compartment to no more than 22,500 sq ft (2100 sq m), of which both length and width shall be no more than 150 ft (45 m).

Exception No. 1: Protection may be accomplished in conjunction with the provision of horizontal exits.

Exception No. 2: One dimension may be extended provided that the total width plus length does not exceed 300 ft (91 m) and provided that travel distance from a room to a smoke barrier door or horizontal exit is no more than 150 ft (45 m).

13-3.7.2 Smoke barriers shall be provided on stories which are usable but unoccupied.

13-3.7.3 Any required smoke barrier shall be constructed in accordance with Section 6-3 and shall have a fire resistance rating of at least ½ hour.

Exception: When an atrium is used, smoke barriers may terminate at an atrium wall. A minimum of two separate smoke compartments shall be provided on each floor.

13-3.7.4 At least 30 net sq ft (2.8 sq m) per patient in a hospital or nursing home or 15 net sq ft (1.4 sq m) per resident in a custodial 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 litter patients or in supervisory care facilities at least 6 net sq ft (.56 sq m) per occupant shall be provided on each side of the smoke barrier for the total number of occupants in adjoining compartments.

13-3.7.5 For purposes of this section the number of health care occupants shall be determined by actual count of patient bed capacity.

13-3.7.6 Openings in smoke barriers shall be protected by wired glass panels in steel frames, by doors of 20-minute fire protection rating, or by 1¾-in. (4.4-cm) solid bonded wood core doors as a minimum.

Exception: Doors may have wired glass vision panels installed in approved metal frames not exceeding 1,296 sq in. (.84 sq m).

13-3.7.7 Doors in smoke barriers shall comply with Section 6-3 and shall be self-closing. Such doors in smoke barriers shall not be required to swing with exit travel. Positive latching hardware is not required.

Exception: Doors may be held open only if they meet the requirements of 13-2.11.4.

13-3.8 Special Features.

13-3.8.1 Every patient sleeping room shall have an outside window or outside door with light. The maximum allowable sill height shall not exceed 36 in. (91 cm) above the floor.

Exception No. 1: The window sill in special nursing care areas such as those housing ICU, CCU, hemodialysis, and neo-natal patients may be up to 60 in. (152 cm) above the floor.

Exception No. 2: Rooms intended for occupancy of less than 24 hours, such as those housing obstetrical labor beds, recovery beds, and observation beds in the emergency department; and newborn nurseries, need not comply with this requirement.

Exception No. 3: Windows opening into atriums when the atrium has a smoke removal system are, for the purposes of this requirement, considered outside windows.

SECTION 13-4 SPECIAL PROVISIONS

13-4.1 Windowless Buildings. See Section 30-7 for requirements for windowless buildings.

13-4.2 Operating Features. (*See Chapter 31.*)

SECTION 13-5 BUILDING SERVICES

13-5.1 Utilities. Utilities shall comply with the provisions of Section 7-1.

13-5.2 Heating, Ventilating and Air Conditioning.

13-5.2.1 Heating, ventilating and air conditioning shall comply with the provisions of Section 7-2 and shall be installed in accordance with the manufacturer's specifications.

Exception: As modified in 13-5.2.2 following.

13-5.2.2* Portable space heating devices are prohibited. Any heating device other than a central heating plant shall be so designed and installed that combustible material will not be ignited by it or its appurtenances. If fuel fired, such heating devices shall be chimney or vent connected, shall take air for combustion directly from the outside, and shall be so 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 may be used in locations other than means of egress and patient sleeping areas, provided such heaters are located high enough to be out of the reach of persons using the area and provided they are equipped with the safety features called for above.

Exception No. 2: Fireplaces may be installed and used only in areas other than patient sleeping areas, provided that these areas are separated from patient sleeping spaces by construction having a 1-hour fire resistance rating and they comply with NFPA 211, Standard for Chimneys, Fireplaces and Vents. In addition thereto, the fireplace shall be equipped with a heat tempered glass, or other approved material, fireplace enclosure guaranteed against breakage up to a temperature of 650°F (340°C). If, in the opinion of the authority having jurisdiction, special hazards are present, a lock on the enclosure and other safety precautions may be required.

Exception No. 3: Portable space heating devices shall be permitted to be used in nonsleeping staff and employee areas when the heating elements of such a device are limited to not more than 212°F (100°C).

13-5.3 Elevators, dumbwaiters, and vertical conveyors shall comply with the provisions of Section 7-4.

13-5.4 Rubbish Chutes, Incinerators and Laundry Chutes.

13-5.4.1 Any existing linen and trash chute, including pneumatic rubbish and linen systems, which 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 suitable for a Class B location and having a fire protection rating of 1½ hours. All new chutes shall comply with Section 7-5.

13-5.4.2 Any rubbish chute or linen chute, including pneumatic rubbish and linen systems, shall be provided with automatic extinguishing protection installed in accordance with Section 7-7 (*see Section 7-5*).

13-5.4.3 Any trash chute shall discharge into a trash collecting room used for no other purpose and protected in accordance with Section 6-4.

13-5.4.4 Existing flue-fed incinerators shall be sealed by fire-resistive construction to prevent further use.

SECTION 13-6 EXISTING AMBULATORY HEALTH CARE CENTERS

13-6.1 General Requirements.

13-6.1.1 Application.

13-6.1.1.1 Existing ambulatory health care centers shall comply with the provisions of both Chapter 27 and (this) Section 13-6, as may be more stringent.

13-6.1.1.2 This section establishes life safety requirements, in addition to those required in Chapter 27, for the design of all ambulatory health care centers and outpatient surgical centers which meet the requirements of 13-1.3(e).

13-6.1.1.3 Modification of Retroactive Provisions.

13-6.1.1.3.1 The requirements of this section may be modified if their application clearly would be impractical in the judgment of the authority having jurisdiction and if the resulting arrangement could be considered as presenting minimum hazard to the life safety of the occupants. The requirements may be modified by the authority having jurisdiction to allow alternative arrangements that will secure as nearly equivalent safety to life from fire as practical.

13-6.1.2 Reserved.

13-6.1.3 Special Definitions. (*See 13-1.3.*)

13-6.1.4 Classification of Occupancy. (*See 13-1.3.*)

13-6.1.5 Reserved.

13-6.1.6 Minimum Construction Requirements.

13-6.1.6.1 For purposes of 13-6.1.6, stories shall be counted starting at the primary level of exit discharge and ending at the highest occupiable level. For the purposes of this section, the primary level of exit discharge of a building shall be that floor which is level with or above finished grade of this exterior wall line for 50 percent or more of its perimeter.

13-6.1.6.2 Buildings of one story in height housing ambulatory health care centers may be of Type I, II, III, IV or V construction. (*See 6-2.1.*)

13-6.1.6.3 Buildings of two or more stories in height housing ambulatory health care centers may be of Type I (443), I (332), or II (222), Type II (111), Type III (211), Type IV (2HH) or Type V (111) construction. (*See 6-2.1.*)

Exception: Such buildings may be constructed of Type II (000), III (200) or V (000) if protected throughout by an approved automatic sprinkler system in accordance with Section 7-7.

13-6.1.6.4 Any level below the level of exit discharge shall be separated from the level of exit discharge by at least Type II (111), Type III (211) or Type V (111) construction. (*See 6-2.1.*)

Exception: Such separation is not required for such levels if they are under the control of the ambulatory health care center and any hazardous spaces are protected in accordance with Section 6-4.

13-6.1.6.5 In existing buildings, the authority having jurisdiction may accept construction systems of lesser fire resistance than required above if it can be demonstrated to its satisfaction that in cases of fire, prompt evacuation of the center can be made or that the exposing occupancies and materials of construction present no threat of fire penetration from such occupancy into the ambulatory health care center or collapse of the structure.

13-6.1.7 Occupant Load.

13-6.2 Means of Egress Requirements.

13-6.2.1 General. Every aisle, passageway, corridor, exit discharge, exit location and access shall be in accordance with Chapter 5.

Exception: As modified in the following paragraphs.

13-6.2.2 Types of Exits. Exits shall be restricted to the permissible types described in 27-2.2.

13-6.2.3 Capacity of Means of Egress.

13-6.2.3.1 The capacity of any required means of egress shall be determined in accordance with the provisions of 27-2.3 and shall be based on its width as defined in Section 5-3.

13-6.2.3.2* The minimum width of any corridor or passageway required for exit access shall be 44 in. (112 cm) clear.

13-6.2.3.3* Doors in the means of egress from diagnostic or treatment areas, such as X-ray, surgical or physical therapy, shall be at least 34 in. (86 cm) wide.

13-6.2.4 Number of Exits.

13-6.2.4.1 At least two exits of the types described in 27-2.2 (Business Occupancy) located remote from each other shall be provided for each floor or fire section of the building.

13-6.2.4.2 Any room and any suite of rooms of more than 1,000 sq ft (93 sq m) shall have at least two exit access doors located remote from each other.

13-6.2.5 Arrangement of Means of Egress. (*See 27-2.5.*)

13-6.2.6 Travel Distance to Exits.

13-6.2.6.1 Travel distance shall be measured in accordance with Section 5-6.

13-6.2.6.2 Travel distance:

(a) Between any room door required as exit access and an exit shall not exceed 100 ft (30 m); and

(b) Between any point in a room and an exit shall not exceed 150 ft (45 m).

Exception: The travel distance in (a) or (b) above may be increased by 50 ft (15 m) in buildings protected throughout by an approved automatic sprinkler system.

13-6.2.7 Discharge from Exits. (*See 27-2.7.*)

13-6.2.8 Illumination of Means of Egress. Each ambulatory health care center shall be provided with illumination of means of egress in accordance with Section 5-8.

13-6.2.9 Emergency Lighting and Essential Electrical Systems.

13-6.2.9.1 Each ambulatory health care center shall be provided with emergency lighting in accordance with Section 5-9.

13-6.2.9.2 Where general anesthesia or life support equipment is used, each ambulatory health care center shall be provided with an essential electrical system in accordance with Chapter 8, "Essential Electrical System for Health Care Facilities," of NFPA 99, *Standard for Health Care Facilities.*

Exception: Where battery operated equipment is provided and acceptable to the authority having jurisdiction.

13-6.2.10 Marking of Means of Egress. Signs designated exits and ways of travel thereto shall be provided in accordance with Section 5-10.

13-6.2.11 Special Features.

13-6.2.11.1 Special locking arrangements in accordance with 5-2.1.6 are permitted on exterior doors.

13-6.2.11.2 Any door in an exit passageway, horizontal exit, smoke barrier, stairway enclosure or hazardous area enclosure may be held open only by an automatic release device which complies with 5-2.1.8. The required manual fire alarm system and the systems required by 5-2.1.8(d) shall be arranged so as to initiate the closing action of all such doors by zone or throughout the entire facility.

13-6.2.11.3 Where doors in a stair enclosure are held open by an automatic device as permitted in 13-6.2.11.2, initiation of a door closing action on any level shall cause all doors at all levels in the stair enclosure to close.

13-6.3 Protection.

13-6.3.1 Protection of Vertical Openings. (*See 27-3.1.*)

13-6.3.2 Protection from Hazards. (*See 27-3.2.*)

13-6.3.2.1 Laboratories employing quantities of flammable, combustible, or hazardous materials which are considered as severe hazard shall be protected in accordance with Chapter 7, "Laboratories in Health Related Institutions," of NFPA 99, *Standard for Health Care Facilities.*

13-6.3.2.2 Anesthetizing locations shall be protected in accordance with Chapter 4, "Inhalation Anesthetics in Ambulatory Care Facilities," of NFPA 99, *Standard for Health Care Facilities.*

13-6.3.3 Interior Finish. (*See 27-3.3.*)

13-6.3.4 Detection, Alarm and Communications Systems.

13-6.3.4.1 General. Centers shall be provided with a fire alarm system in accordance with Section 7-6, except as modified below.

13-6.3.4.2 Initiation. Initiation of the required fire alarm systems shall be by manual means, in accordance with 7-6.2, and by means of any detection devices or detection systems required.

13-6.3.4.3 Occupant Notification. Occupant notification shall be accomplished automatically, without delay, upon operation of any fire alarm activating device by means of an internal audible general alarm in accordance with 7-6.3.

Exception No. 1: The presignal system allowed by the Exception to 7-6.3.2 shall not be permitted.

Exception No. 2: Zoned, coded systems shall be permitted.

13-6.3.4.4 Emergency Forces Notification. Fire department notification shall be accomplished in accordance with 7-6.4.

13-6.3.4.5 Emergency Control. Operation of any activating device in the required fire alarm system shall be arranged to automatically accomplish, without delay, any control functions required to be performed by that device (*see 7-6.5*).

13-6.3.5 Extinguishment Requirements. (*See 27-3.5.*)

13-6.3.5.1 The sprinkler piping, serving no more than six sprinklers for any isolated hazardous area, may be connected directly to a domestic water supply system having a capacity sufficient to provide 0.15 gal per minute per sq foot (6.1 L/min/sq m) 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. For new installations in existing buildings when more than two sprinklers are installed in a single area, water flow detection shall be provided to sound the building fire alarm, or notify by a signal any constantly attended location such as PBX, security, or emergency room, whereby necessary corrective action shall be directed.

13-6.3.5.2 Portable fire extinguishers shall be provided in ambulatory health care occupancies in accordance with 7-7.4.1.

13-6.3.6 Corridors.

13-6.3.7 Subdivision of Building Space.

13-6.3.7.1 Ambulatory health care occupancies shall be separated from other tenants and occupancies by walls having at least 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 at least 1¾-in. (4.4-cm) solid bonded wood core or the equivalent and equipped with positive latches. These doors shall be self-closing and normally kept in the closed position except when in use. Any vision panels shall be of fixed wired glass set in approved metal frames and limited in size to 1,296 sq in. (.84 sq m).

13-6.3.7.2 The ambulatory health care facility shall be divided into at least two smoke compartments.

Exception: Facilities less than 2,000 sq ft (185 sq m) and protected by an approved automatic smoke detection system need not be divided.

13-6.3.7.3 Any required smoke barrier shall be constructed in accordance with Section 6-3 and shall have a fire resistance rating of at least 1 hour.

13-6.3.7.4 Vision panels in the smoke barrier shall be of fixed wired glass set in approved metal frames and shall be limited in size to 1,296 sq in. (.84 sq m).

13-6.3.7.5 Doors in smoke barriers shall be at least 1¾-in. (4.4-cm) solid bonded wood core or the equivalent and shall be self-closing. A vision panel is required.

13-6.3.7.6 Doors in smoke barriers shall normally be kept closed or, if held open, they shall be equipped with automatic devices which will release the doors upon activation of:

(a) The fire alarm system, and either

(b) A local smoke detector, or

(c) A complete automatic fire extinguishing system or complete automatic fire detection system.

13-6.4 Special Provisions. (*See Section 27-4.*)

13-6.5 Building Services.

13-6.5.1 Utilities. Utilities shall comply with the provisions of Section 7-1.

13-6.5.2 Heating, Ventilating and Air Conditioning.

13-6.5.2.1 Heating, ventilating and air conditioning shall comply with the provisions of Section 7-2 and shall be installed in accordance with the manufacturer's specifications.

Exception: As modified in 13-6.5.2.2 following.

13-6.5.2.2* Portable space heating devices are prohibited. Any heating device other than a central heating plant shall be so designed and installed that combustible material will not be ignited by it or its appurtenances. If fuel fired, such heating devices shall be chimney or vent connected, shall take air for combustion directly form the outside, and shall be so 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 may be used in locations other than means of egress and patient treatment areas, provided such heaters are located high enough to be out of the reach of persons using the area and provided they are equipped with the safety features called for above.

Exception No. 2: Portable space heating devices shall be permitted to be used in nonsleeping staff and employee areas when the heating elements of such a device are limited to not more than 212°F (100°C).

13-6.5.3 Elevators, dumbwaiters and vertical conveyors shall comply with the provisions of Section 7-4.

13-6.5.4 Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 7-5.

CHAPTER 14 NEW DETENTION AND CORRECTIONAL OCCUPANCIES

(See also Chapter 31.)

SECTION 14-1 GENERAL

14-1.1 Application.

14-1.1.1 New detention and correctional facilities shall comply with the provisions of this chapter. They shall also comply with the applicable requirements of Chapter 31.

14-1.1.2 This chapter establishes life safety requirements for the design of all new detention and correctional facilities.

Exception No. 1: Use Condition I requirements are those stated in the applicable requirements of Chapter 16, 18, or 20.

Exception No. 2: Facilities found to have equivalent safety. One such method for determining this equivalency is given in Appendix E.*

14-1.1.3 Detention and correctional occupancies are those used for purposes such as jails, detention centers, correctional institutions, reformatories, houses of correction, pre-release centers, and other residential-restrained care facilities where occupants are confined or housed under some degree of restraint or security.

14-1.1.4 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.

14-1.1.5 Total Concept. All detention and correctional facilities shall be so designed, constructed, maintained and operated as to minimize the possibility of a fire emergency. Because the safety of all occupants in detention and correctional facilities cannot be adequately assured solely by a dependence on evacuation of the building, their protection from fire shall be provided by appropriate arrangement of facilities, adequate trained staff, and careful development of operating, security, and maintenance procedures composed of the following:

(a) Proper design, construction and compartmentation,

(b) Provision for detection, alarm and extinguishment,

(c) Fire prevention and planning, training, and drilling in programs for the isolation of fire and transfer of occupants to areas of refuge or evacuation of the building, or protection of the occupants in place,

(d) Provision of security to the degree necessary for the safety of the public and the occupants of the facility.

14-1.1.6 Additions. Additions shall be separated from any existing structure not conforming with the provisions within Chapter 15 by a fire barrier having at least a 2-hour fire resistance rating constructed to the standards of the addition. Doors in these partitions shall normally be kept closed.

Exception: Doors may be held open if they meet the requirements of the Exception to 5-2.1.8.

14-1.2* Mixed Occupancies.

14-1.2.1 Egress provisions for areas of detention and correctional facilities which 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, necessary staff shall be provided for the supervised release of occupants during all times of use.

14-1.2.2 Sections of detention and correctional facilities may be classified as other occupancies if they meet all of the following conditions:

(a) They are not intended to serve residents for purpose of housing, customary access or means of egress.

(b) They are adequately separated from areas of detention or correctional occupancies by construction having a fire resistance rating of at least 2 hours.

14-1.2.3 Detention and correctional occupancies in buildings housing other occupancies shall be completely separated from the other occupancies by construction having a fire resistance rating of at least 2 hours, as provided for additions in 14-1.1.6.

14-1.2.4 All means of egress from detention and correctional occupancies that traverse other use areas shall, as a minimum, conform to requirements of this *Code* for detention and correctional occupancies.

14-1.2.5 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 14-3.2.

14-1.2.6 Non-detention or non-correctional related occupancies classified as containing high hazard contents shall not be permitted in buildings housing detention or correctional occupancies.

14-1.3 Special Definitions.

(a) **Fire Barrier.** See Chapter 6.

(b) **Fire Compartment.** See Chapter 6.

(c) **Residential Housing Area.** Includes sleeping areas and any contiguous day room, group activity space or other common spaces for customary access of residents.

(d) **Sallyport (Security Vestibule).** A compartment provided with two or more doors where the intended purpose is to prevent the continuous and unobstructed passage by allowing the release of only one door at a time.

(e) **Smoke Barrier.** See Chapter 6.

(f) **Smoke Compartment.** See Chapter 6.

14-1.4 Classification of Occupancy.

14-1.4.1* 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 by members of each of these groups will vary according to type of facility, its function and programs. For applications of the life safety requirements which follow, the resident user category is divided into five groups:

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 the *Code*.

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.

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 group activity space, with egress impeded by remote control release of means of egress from such smoke compartment to another smoke compartment.

Use Condition IV — Impeded Egress

Free movement is restricted from an occupied space. Remote controlled release is provided to permit movement from all sleeping rooms, activity spaces and other occupied areas within the smoke compartment to other smoke compartment(s).

Use Condition V — Contained

Free movement is restricted from an occupied space. Staff controlled manual release at each door is provided to permit movement from all sleeping rooms, activity spaces and other occupied areas within the smoke compartment to other smoke compartment(s).

14-1.4.2* To classify as Use Condition III or 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.

14-1.4.3 Areas housing occupancies corresponding to Use Condition I — Free Egress shall conform to the requirements of residential occupancies under this *Code*.

14-1.5 Classification of Hazard of Contents. The classification of hazard of contents shall be as defined in Section 4-2.

14-1.6 Minimum Construction Requirements.

14-1.6.1 For the purpose of 14-1.6, stories shall be counted starting at the primary level of exit discharge.

14-1.6.2 Detention and correctional occupancies shall be limited to the following types of building construction (*see 6-2.1*):

Type of Construction	1 story with Basement	1 story without Basement	2 story	3 story	4 story and Higher
I (443) I (332) II (222)	X	X	X	X	X
II (111)	X††	X	X††	N.P.	N.P.
III (211) IV (2HH) V (111)	X††	X††	X††	N.P.	N.P.
II (000) III (200) V (000)	X†	X†	X†	N.P.	N.P.

X: Permitted types of construction
X†: Permitted if the entire building is protected throughout by an approved automatic sprinkler system in accordance with Section 7-7.
X††: X† applies in buildings where Use Condition V is used.
N.P.: Not Permitted

14-1.6.3 All interior walls and partitions in Type I or Type II construction shall be of noncombustible or limited-combustible construction.

14-1.7 Occupant Load. The occupant load for which means of egress shall be provided for any floor shall be the maximum number of persons intended to occupy that floor, but not less than one person for each 120 sq ft (11.1 sq m) gross floor area.

SECTION 14-2 MEANS OF EGRESS

14-2.1 General. Means of egress shall comply with Chapter 5.

Exception: As otherwise provided or modified in this section.

14-2.2 Types of Exits.

14-2.2.1 Exits of the specified number and width shall be one or more of the following types, in accordance with the provisions of Chapter 5.

(a) *Doors.* (*See 5-2.1.*)

(b) *Stairs.* (*See 5-2.2.*)

1. The provisions of 5-2.2.6.4(h) and 5-2.2.6.5(c) do not apply.

(c) *Smokeproof Enclosures.* (*See 5-2.3.*)

(d) *Horizontal Exits.* (*See 5-2.4.*) A horizontal exit shall be in conformance with 5-2.4, modified as below:

1. At least 6 sq ft (.56 sq m) of accessible space per occupant shall be provided on each side of the horizontal exit for the total number of people in adjoining compartments.

2. Horizontal exits may be substituted for other exits provided the maximum exit travel distance specified in 14-2.6 is not exceeded. Horizontal exits may comprise 100 percent of the exits required. Every fire compartment for which credit is allowed in connection with a horizontal exit shall not be required to have a stairway or door leading directly outside, provided the adjoining fire compartments have stairways or doors leading directly outside.

(e) *Ramps.* (*See 5-2.5.*)

(f) *Exit Passageways.* (*See 5-2.6.*)

14-2.3 Capacity of Means of Egress.

14-2.3.1 The capacity of any required means of egress shall be in accordance with Section 5-3.

14-2.3.2 Aisles, corridors, and ramps required for access or exit shall be at least 4 ft (122 cm) in width.

14-2.3.3 For residents' sleeping room door widths, see 14-2.11.3.

14-2.4 Number of Exits.

14-2.4.1 At least two exits of the types permitted in 14-2.2, located remote from each other, shall be provided for each occupied floor of the building.

14-2.4.2 At least two exits of the type permitted in 14-2.2, located remote from each other, shall be accessible from each fire or smoke compartment.

14-2.4.3* At least one approved exit shall be accessible from each fire compartment and each required smoke compartment

into which residents may be moved in a fire emergency with the exits so arranged that egress shall not require return through the zone of fire origin.

14-2.5 Arrangement of Means of Egress.

14-2.5.1 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 dayroom, group activity space, or other common spaces, may intervene. Where individual occupant sleeping rooms adjoin a dayroom or group activity space which is utilized for access to an exitway, such sleeping rooms may open directly to the dayroom or space and may be separated in elevation by a one-half or full-story height (see 14-3.1.2).

14-2.5.2 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 Conditions II, III or IV and 20 ft (6.1 m) for Use Condition V.

14-2.5.3 A sallyport may be permitted in a means of egress where there are provisions for continuous and unobstructed passage through the sallyport during an emergency exit condition.

14-2.6 Travel Distance to Exits.

14-2.6.1 Travel distance:

(a) Between any room door required as exit access and an exit shall not exceed 100 ft (30 m);

(b) Between any point in a room and an exit shall not exceed 150 ft (45 m); and

(c) Between any point in a sleeping room to the door of that room shall not exceed 50 ft (15 m).

Exception No. 1: The travel distance in (a) or (b) above may be increased by 50 ft (15 m) in buildings protected throughout by an approved automatic sprinkler system or smoke control system.

Exception No. 2: The travel distance in (c) above may be increased to 100 ft (30 m) in open dormitories where the enclosing walls of the dormitory space are at least of smoketight construction. Where travel distance to the exit access door from any point within the dormitory exceeds 50 ft (15 m), at least two exit access doors remote from each other shall be provided.

14-2.7 Discharge from Exits.

14-2.7.1 Exits may discharge into a fenced or walled courtyard, provided that not more than two walls of the courtyard are the building walls from which exit is being made. Enclosed yards or courts shall be of sufficient size to accommodate all occupants, a minimum of 50 ft (15 m) from the building with a net area of 15 sq ft (1.4 sq m) per person.

14-2.7.2 All exits may discharge through the level of exit discharge. The requirements of 5-7.2 may be waived provided that not more than 50 percent of the exits discharge into a single fire compartment.

14-2.8 Illumination of Means of Egress. Illumination shall be in accordance with Section 5-8.

14-2.9 Emergency Lighting. Emergency lighting shall be in accordance with Section 5-9.

14-2.10 Marking of Means of Egress. Exit marking shall be provided in areas accessible to the public in accordance with Section 5-10.

Exception: Exit signs may be omitted in sleeping room areas.

14-2.11 Special Features.

14-2.11.1 Doors within means of egress shall be as required in Chapter 5.

Exception: As provided in 14-2.11.2 through 14-2.11.10.

14-2.11.2 Doors may be locked in accordance with the applicable Use Condition.

14-2.11.3* Doors to resident sleeping rooms shall be at least 28 in. (71 cm) in clear width.

14-2.11.4 Doors in a means of egress may be of the horizontal sliding type provided the force to slide the door to its fully open position does not exceed 50 lb (222 N) with a perpendicular force against the door of 50 lb (222 N).

14-2.11.5 Doors from areas of refuge to the exterior may be locked with key lock in lieu of locking methods described in 14-2.11.6. 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.

14-2.11.6* Any remote release used in a means of egress shall be provided with reliable means of operation, remote from the resident living areas, to release locks on all doors.

Exception: Provisions for remote locking and unlocking may be waived provided not more than ten doors are necessary to be unlocked in order to move all occupants from one smoke compartment to an area of refuge as promptly as required for remote unlocking. The opening of all necessary doors shall be accomplished with no more than two separate keys.

14-2.11.7 All remote release operated doors shall be provided with a redundant means of operation as follows:

(a) Power-operated sliding doors or power operated locks shall be so constructed 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 in accordance with 5-9.2.3 is provided for the power operation or a remote manual mechanical release is provided.

(b) Mechanically operated sliding doors or mechanically operated locks shall be provided with a manual mechanical means to release and open the door at the door.

14-2.11.8 Doors remotely unlocked under emergency conditions shall not automatically relock when closed unless specific action is taken at the remote location to enable doors to relock.

14-2.11.9 Standby emergency power shall be provided for all electrically power-operated sliding doors and power-operated locks. Power shall be arranged to automatically operate upon failure of normal power within 10 seconds and to maintain the necessary power source for at least 1½ hours.

Exception: This provision is not applicable for facilities with ten locks or less complying with the exception in 14-2.11.6.

14-2.11.10 The provisions of 5-2.1.5.2 for stairway reentry do not apply.

14-2.11.11 Spiral stairs meeting the requirements of 5-2.2.2.4 are permitted for access to and between staff locations.

SECTION 14-3 PROTECTION

14-3.1 Protection of Vertical Openings.

14-3.1.1 Any stairway, ramp, elevator, hoistway, light, or ventilation shaft, chute, or other vertical opening between stories shall be enclosed in accordance with Section 6-2.

Exception: Stairs that do not connect a corridor, do not connect more than two levels, and do not serve as a means of egress need not comply with these regulations.

14-3.1.2 Two communicating floor levels are permitted without enclosure protection between levels provided all the following conditions are met:

(a) The entire normally occupied area, including all communicating floor levels, is sufficiently open and unobstructed so that it may be assumed that a fire or other dangerous condition in any part will be readily obvious to the occupants or supervisory personnel in the area.

(b) Exit capacity is sufficient to provide simultaneously for all the occupants of all communicating levels and areas, all communicating levels in the same fire area being considered as a single floor area for purposes of determination of required exit capacity.

(c) Each floor level, considered separately, has at least one-half of its individual required exit capacity accessible by exit access leading directly out of that level without transversing another communicating floor level.

14-3.2 Protection from Hazards.

14-3.2.1 An area used for general storage, boiler or furnace rooms, fuel storage, janitor's closets, maintenance shops including woodworking and painting areas, laundries and kitchens shall be separated from other parts of the building with construction having not less than a 1-hour fire resistance rating and all openings shall be protected with self-closing fire doors, or such area shall be provided with automatic sprinkler protection. Where the hazard is severe, both the 1-hour fire resistance rated separation and automatic sprinklers shall be provided.

Exception No. 1: Where cooking facilities are protected per 7-2.3, kitchens need not be provided with room-wide protection.

Exception No. 2: When, in the opinion of the authority having jurisdiction, such areas are no longer incidental to residents' housing, they shall be separated by 2-hour fire barriers in conjunction with automatic sprinkler protection.

14-3.2.2* Padded cells are severe hazard areas. Doors to padded cells shall be ¾-hour self-closing and self-latching fire door assemblies.

14-3.2.3 Cooking facilities shall be protected in accordance with 7-2.3.

14-3.3 Interior Finish.

14-3.3.1 Interior finish of walls and ceilings in corridors, exits and any space not separated from corridors and exits by a partition capable of retarding the passage of smoke shall be Class A. In all other areas interior finish shall be Class A, B or C in accordance with Section 6-5.

14-3.3.2 Interior floor finish material in corridors and exits shall be Class I in accordance with Section 6-5.

14-3.4 Detection, Alarm and Communications Systems.

14-3.4.1 General.

14-3.4.1.1 Detection and correctional occupancies shall be provided with a fire alarm system in accordance with Section 7-6, except as modified below.

14-3.4.1.2 All required fire alarm systems shall be electrically supervised.

14-3.4.1.3 All fire alarm systems and detection systems required in this section shall be provided with a secondary power supply and the installation shall be in accordance with NFPA 72A, *Standard for the Installation, Maintenance, and Use of Local Protective Signaling Systems.*

14-3.4.2 Initiation. Initiation of the required fire alarm system shall be by manual means, in accordance with 7-6.2, and by means of any detection devices or detection systems required.

Exception No. 1: Manual fire alarm boxes may be locked provided that staff is present within the subject area when occupied and have keys readily available to unlock the boxes.

Exception No. 2: Manual fire alarm boxes may be located in a staff location provided that the staff location is manned when the building is occupied and has direct supervision of the sleeping area.

14-3.4.3 Notification.

14-3.4.3.1 Occupant Notification. Occupant notification shall be accomplished automatically, without delay, upon operation of any fire alarm activating device by means of an internal audible general evacuation alarm in accordance with 7-6.3.

Exception No. 1: Zoned or coded systems shall be permitted.

Exception No. 2: Any smoke detectors required by this chapter may be arranged to alarm at a constantly attended location only and are not required to accomplish general alarm indication.*

14-3.4.3.2 Emergency Forces Notification. Fire department notification shall be accomplished in accordance with 7-6.4.

Exception: Any smoke detectors required by this chapter are not required to transmit an alarm to the fire department.

14-3.4.4 Detection. An approved automatic smoke detection system shall be installed, in accordance with Section 7-6, throughout all resident housing areas.

Exception No. 1: Smoke detectors may be omitted from sleeping rooms with 4 or fewer occupants in Use Condition II or III.

Exception No. 2: Smoke detectors may be omitted in sleeping rooms with 4 or fewer occupants in buildings protected throughout with an approved automatic sprinkler system installed in accordance with Section 7-7.

Exception No. 3: Other arrangements and positioning of smoke detectors may be used to prevent damage or tampering or for other purposes provided the function of detecting any fire is fulfilled and the siting of detectors is such that the speed of detection will be equivalent to that provided by the spacing and arrangements described in Section 7-6. This may include the location of detectors in exhaust ducts from cells, behind grilles, or in other locations. The equivalent performance of the design, however, must be acceptable to the authority having jurisdiction in accordance with the equivalency concepts specified in Section 1-5 of this Code.

14-3.5 Extinguishment Requirements.

14-3.5.1 When required by 14-1.6, facilities shall be protected throughout by an approved supervised automatic sprinkler system in accordance with Section 7-7.

14-3.5.2 Where exceptions are stated in the provisions of this *Code* (*including those specified in 14-3.8.1*) for detention and correctional occupancies equipped with an approved automatic extinguishing system, and where such systems are required, the systems shall be in complete accordance with Section 7-7 for systems in light hazard occupancies and shall be electrically interconnected with the fire alarm system.

14-3.5.3 The sprinkler piping, serving no more than six sprinklers for any isolated hazardous area, may be connected directly to a domestic water supply system having a capacity sufficient to provide 0.15 gal per minute per sq ft (6.1 L/min/sq m) 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. (*For sprinkler requirements for hazardous areas see 14-3.2 and for sprinkler requirements for chutes see 14-5.4.*)

14-3.5.4 Portable fire extinguishers shall be provided in accordance with 7-7.4.1.

Exception No. 1: Access to portable fire extinguishers may be locked.*

Exception No. 2: Portable fire extinguishers may be located at staff locations only.

14-3.5.5 Standpipe and hose systems shall be provided in accordance with 7-7.4.2 as follows:

(a) Class II standpipe and hose systems shall be provided for any building over two stories in height, and

(b) Standpipe and hose systems for fire department use, either Class I or III, shall be provided for all unsprinklered buildings over two stories in height.

Exception No. 1: One-inch (2.5-cm) diameter formed hose on hose reels may be used to provide Class II service.

Exception No. 2: Separate Class I and Class II systems may be used in lieu of Class III.

14-3.6 Corridors. [*See 14-3.8, Special Features (Subdivision of Resident Housing Spaces).*]

14-3.7 Subdivision of Building Spaces.

14-3.7.1 Smoke barriers shall be provided, regardless of building construction type, as follows:

(a) To divide every story used by residents for sleeping, or any other story having an occupant load of 50 or more persons, into at least two compartments, and

(b) To limit the housing of a maximum of 200 residents in any smoke compartment, and

(c) To limit the travel distance to a door in a smoke barrier:

1. From any room door required as exit access to 100 ft (30 m),

2. From any point in a room to 150 ft (45 m).

Exception No. 1: Protection may be accomplished with horizontal exits (see 5-2.4).

Exception No. 2: Spaces having direct exit to (a) a public way, (b) a building separated from the resident housing area by a 2-hour fire resistance rating or 50 ft (15 m) of open space, or (c) an enclosed area having a holding space 50 ft (15 m) from the housing area that provided 6 sq ft (.56 sq m) or more of refuge area per person (resident, staff, visitors, etc.) that may be present at the time of the fire fulfills the requirement for subdivision of such spaces provided the locking arrangement of doors involved meets the requirements for doors at the compartment barrier for the use condition involved.

14-3.7.2* Any required smoke barrier shall be constructed in accordance with Section 6-3. Barriers shall be of substantial construction and shall have structural fire resistance. Fixed wired glass vision panels shall be permitted in such barriers provided they do not individually exceed 1,296 sq in. (.84 sq m) in area and are mounted in approved steel frames. There is no restriction on the total number of such vision panels in any barrier (e.g., a smoke barrier may consist of wire glass panels mounted in a security grille arrangement).

14-3.7.3 At least 6 net sq ft (.56 sq m) 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 whenever the occupants are moved across the smoke barrier in a fire emergency.

14-3.7.4 Doors in smoke barriers shall be self-closing or automatic-closing as required in 5-2.1.8. Swinging doors shall be self-latching.

14-3.7.5 Doors in smoke barriers shall conform with the requirements for doors in means of egress as specified in Section 14-2 and shall have locking and release arrangements according to the Use Condition.

14-3.7.6 Vision panels of approved transparent wired glass not exceeding 1,296 sq in. (.84 sq m) in steel frames shall be provided in each door in a smoke barrier.

14-3.7.7 Smoke dampers shall be provided in accordance with 6-3.4.

Exception: Other arrangements and positioning of smoke detectors may be used to prevent damage or tampering or for other purposes provided the function of detecting any fire is fulfilled and the siting of detectors is such that the speed of

detection will be equivalent to that provided by the required spacing and arrangement.

14-3.8 Special Features. (Subdivision of Resident Housing Spaces.)

14-3.8.1 Subdivision of facility spaces shall comply with Table 14-3.8.1.

SECTION 14-4 SPECIAL PROVISIONS

14-4.1 Windowless Buildings.

14-4.1.1 For the purposes of this chapter a windowless building or portion of a building is one with nonopenable windows, windows not readily breakable, or with no windows.

14-4.1.2 Windowless buildings shall be provided with vent openings, smoke shafts, or an engineered smoke control system to provide ventilation (mechanical or natural) for each windowless smoke compartment.

14-4.2 Underground Buildings.

14-4.2.1 See Chapter 30 for requirements for underground buildings.

14-4.3 Operating Features. (*See Chapter 31.*)

SECTION 14-5 BUILDING SERVICES

14-5.1 Utilities.

14-5.1.1 Utilities shall comply with the provisions of Section 7-1.

14-5.1.2 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.*

14-5.2 Heating, Ventilating and Air Conditioning.

14-5.2.1 Heating, ventilating and air conditioning equipment shall comply with the provisions of Section 7-2 and shall be installed in accordance with manufacturer's specifications.

Exception: As modified in 14-5.2.2 following.

14-5.2.2 Portable space heating devices are prohibited. Any heating device other than a central heating plant shall be so designed and installed that combustible material will not be ignited by it or its appurtenances. If fuel-fired, such heating devices shall be chimney or vent connected, shall take air for combustion directly from outside, and shall be so 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 may be used in locations other than means of egress and sleeping areas provided such heaters are located high enough to be out of the reach of persons using the area and provided they are vent connected and equipped with the safety devices called for above.

14-5.2.3 Combustion and ventilation air for boiler, incinerator or heater rooms shall be taken directly from and discharged directly to the outside air.

Table 14-3.8.1

USE CONDITION / Feature	II		III		IV		V	
	NS	AS	NS	AS	NS	AS	NS	AS
Room to Room Separation	NR	NR	NR	NR	ST	NR	FR(½)	ST
Room Face to Corridor Separation	ST	NR	ST	NR	ST	NR	FR	ST
Room Face to Common Space Separation	NR	NR	NR <50 ft* (15 m) ST >50 ft* (15 m)	NR <50 ft* (15 m) ST >50 ft* (15 m)	ST	NR <50 ft* (15 m) ST >50 ft* (15 m)	FR	ST
Common Space to Corridor Separation	FR	NR	FR	NR	FR	NR	FR	ST
Total Openings in Solid Room Face	120 sq in. (.08 sq m)		120 sq in. (.08 sq m)		120 sq in. (.08 sq m)		120 sq in. (.08 sq m) Closable from inside or 120 sq in. (.08 sq m) w/smoke control	

AS — Protected by automatic sprinklers
NS — Not protected by automatic sprinklers
NR — No requirement
ST — Smoketight
FR — Fire Rated — 1 hour
FR(½) — Fire Rated — ½ hour

*This is the travel distance through the common space to the exit access corridor.

NOTE 1: Doors in openings in partitions required to be fire resistive by this chart in other than required enclosures of exits or hazardous areas shall be substantial doors, of construction that will resist fire for at least 20 minutes. Wire glass vision panels are permitted. Latches and door closers are not required on cell doors.

NOTE 2: Doors in openings in partitions required to be smoketight by the chart shall be substantial doors, of construction that will resist the passage of smoke. Latches and door closers are not required on cell doors.

NOTE 3: "Total Openings in Solid Room Face" includes all openings (undercuts, food passes, grilles, etc.), the total of which will not exceed 120 sq in. (.08 sq m). All openings shall be 36 in. (91 cm) or less above the floor.

NOTE 4: Under Use Condition II, III, or IV, a space housing not more than 16 persons and subdivided by open construction (any combination of grating doors and grating walls or solid walls) may be considered one room. The perimeter walls of such space shall be of smoketight construction. Smoke detection shall be provided in such space. Under Use Condition IV, common walls between sleeping areas within the space shall be smoketight and grating doors and fronts may be used.

14-5.3 Elevators, dumbwaiters, and vertical conveyors shall comply with the provisions of Section 7-4.

14-5.4 Rubbish Chutes, Incinerators and Laundry Chutes.

14-5.4.1 Rubbish chutes, incinerators and laundry chutes shall comply with the provisions of Section 7-5.

14-5.4.2 Any rubbish chute or linen chute, including pneumatic rubbish and linen systems, shall be provided with automatic extinguishing protection installed in accordance with Section 7-7.

14-5.4.3 Any trash chute shall discharge into a trash collecting room used for no other purpose and protected in accordance with Section 6-4.

14-5.4.4 Any incinerator shall not be directly flue-fed nor shall any floor chute directly connect with the combustion chamber.

CHAPTER 15 EXISTING DETENTION AND CORRECTIONAL OCCUPANCIES

(See also Chapter 31.)

SECTION 15-1 GENERAL

15-1.1 Application.

15-1.1.1 Existing detention and correctional facilities shall comply with the provisions of this chapter. Provisions of Chapter 14 do not apply to existing detention and correctional facilities. Existing facilities shall also comply with the applicable requirements of Chapter 31.

15-1.1.2 This chapter establishes life safety requirements for all existing detention and correctional facilities.

Exception No. 1: Use Condition I requirements are those stated in the applicable requirements for existing buildings of Chapters 17, 19, or 20.

Exception No. 2: Facilities found to have equivalent safety. One such method for determining this equivalency is given in Appendix E.*

15-1.1.3 Detention and correctional occupancies are those used for purposes such as jails, detention centers, correctional institutions, reformatories, houses of correction, pre-release centers, and other residential-restrained care facilities where occupants are confined or housed under some degree of restraint or security.

15-1.1.4 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.

15-1.1.5 Total Concept. All detention and correctional facilities shall be so designed, constructed, maintained and operated as to minimize the possibility of a fire emergency.

Because the safety of all occupants in detention and correctional facilities cannot be adequately assured solely by a dependence on evacuation of the building, their protection from fire shall be provided by appropriate arrangement of facilities, adequate trained staff, and careful development of operating, security, and maintenance procedures composed of the following:

(a) Proper design, construction and compartmentation,

(b) Provision for detection, alarm and extinguishment,

(c) Fire prevention and planning, training, and drilling in programs for the isolation of fire and transfer of occupants to areas of refuge or evacuation of the building, or protection of the occupants in place,

(d) Provision of security to the degree necessary for the safety of the public and the occupants of the facility.

15-1.1.6 Additions. Additions shall be separated from any existing structure not conforming with the provisions within Chapter 15 by a fire barrier having at least a 2-hour fire resistance rating constructed to the standards of the addition. Doors in these partitions shall normally be kept closed.

Exception: Doors may be held open if they meet the requirements of the Exception to 5-2.1.8.

15-1.2* Mixed Occupancies.

15-1.2.1 Egress provisions for areas of detention and correctional facilities which 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, necessary staff shall be provided for the supervised release of occupants during all times of use.

15-1.2.2 Sections of detention and correctional facilities may be classified as other occupancies if they meet all of the following conditions:

(a) They are not intended to serve residents for purpose of housing, customary access or means of egress.

(b) They are adequately separated from areas of detention or correctional occupancies by construction having a fire resistance rating of at least 2 hours.

15-1.2.3 Detention and correctional occupancies in buildings housing other occupancies shall be completely separated from the other occupancies by construction having a fire resistance rating of at least 2 hours as provided for additions in 15-1.1.6.

15-1.2.4 All means of egress from detention and correctional occupancies that traverse other use areas shall, as a minimum, conform to requirements of this *Code* for detention and correctional occupancies.

15-1.2.5 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 15-3.2.

15-1.2.6 Non-detention or non-correctional related occupancies classified as containing high hazard contents shall not be permitted in buildings housing detention or correctional occupancies.

15-1.3 Special Definitions.

(a) **Fire Barrier.** See Chapter 6.

(b) **Fire Compartment.** See Chapter 6.

(c) **Residential Housing Area.** Includes sleeping areas and any contiguous day room, group activity space or other common spaces for customary access of residents.

(d) **Sallyport (Security Vestibule).** A compartment provided with two or more doors where the intended purpose is to prevent the continuous and unobstructed passage by allowing the release of only one door at a time.

(e) **Smoke Barrier.** See Chapter 6.

(f) **Smoke Compartment.** See Chapter 6.

15-1.4 Classification of Occupancy.

15-1.4.1* 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 by members of each of these groups will vary according to type of facility, its function and programs. For

applications of the life safety requirements which follow, the resident user category is divided into five groups:

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 the *Code*.

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.

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 group activity space, with egress impeded by remote control release of means of egress from such smoke compartment to another smoke compartment.

Use Condition IV — Impeded Egress

Free movement is restricted from an occupied space. Remote controlled release is provided to permit movement from all sleeping rooms, activity spaces and other occupied areas within the smoke compartment to other smoke compartment(s).

Use Condition V — Contained

Free movement is restricted from an occupied space. Staff controlled manual release at each door is provided to permit movement from all sleeping rooms, activity spaces and other occupied areas within the smoke compartment to other smoke compartment(s).

15-1.4.2* To classify as Use Condition III or 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.

15-1.4.3 Areas housing occupancies corresponding to Use Condition I Free Egress shall conform to the requirements of residential occupancies under this *Code*.

15-1.5 Classification of Hazard of Contents. The classification of hazard of contents shall be as defined in Section 4-2.

15-1.6 Minimum Construction Requirement.

15-1.6.1 For the purpose of 15-1.6, stories shall be counted starting at the primary level of exit discharge.

15-1.6.2 Detention and correctional occupancies shall be limited to the types of building construction shown in the next column. (*See 6-2.1.*)

Exception No. 1: Any building of Type I or Type II (222 or 111) construction may include roofing systems involving combustible or steel supports, decking or roofing provided:

(a) The roof covering at least meets Class C requirements in accordance with NFPA 256, Fire Tests for Roof Coverings, and

(b) The roof is separated from all occupied portions of the building by a noncombustible floor assembly which includes at least 2½ in. (6.4 cm) of concrete or gypsum fill. To qualify for this exception, the attic or other space so developed shall either be 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 may be disregarded.

Type of Construction	1 story with Basement	1 story without Basement	2 story	3 story	4 story and Higher
I (443) I (332) II (222)	X	X	X	X	X
II (111)	X††	X	X††	X†	X†
III (211) IV (2HH) V (111)	X††	X	X††	X†	X†
II (000) III (200) V (000)	X††	X††	X†	X†	X†

X: Permitted types of construction
X†: Permitted if the entire building is protected throughout by an approved automatic sprinkler system in accordance with Section 7-7.
X††: X† applies in buildings where Use Condition V is used.

15-1.7 Occupant Load. The occupant load for which means of egress shall be provided for any floor shall be the maximum number of persons intended to occupy that floor, but not less than one person for each 120 sq ft (11.1 sq m) gross floor area.

SECTION 15-2 MEANS OF EGRESS

15-2.1 General. Means of egress shall comply with Chapter 5.

Exception: As otherwise provided or modified in this section.

15-2.2 Types of Exits.

15-2.2.1 Exits of the specified number and width shall be one or more of the following types, in accordance with the provisions of Chapter 5.

(a) *Doors.* (*See 5-2.1.*)

(b) *Stairs.* (*See 5-2.2.*)

1. The provisions of 5-2.2.6.4(h) and 5-2.2.6.5(c) do not apply.

(c) *Smokeproof Enclosures.* (*See 5-2.3.*)

(d)* *Horizontal Exits.* A horizontal exit shall be in conformance with 5-2.4 modified as below:

1. At least 6 sq ft (.56 sq m) of accessible space per occupant shall be provided on each side of the horizontal exit for the total number of people in adjoining compartments.

2. Horizontal exits may be substituted for other exits provided the maximum exit travel distance specified in 15-2.6 is not exceeded. Horizontal exits may comprise 100 percent of the exits required.

3. A door in a horizontal exit is not required to swing with travel as specified in 5-2.4.3.3.

(e) *Ramps.* (*See 5-2.5.*)

(f) *Exit Passageways.* (*See 5-2.6.*)

(g) *Fire Escape Stairs.* (*See 5-2.8*)

15-2.3 Capacity of Means of Egress.

15-2.3.1 The capacity of any required means of egress shall be in accordance with Section 5-3.

15-2.3.2 Aisles, corridors, and ramps required for access or exit shall be at least 3 ft (91 cm) wide.

15-2.3.3 For residents' sleeping room door widths, see 15-2.11.3.

15-2.4 Number of Exits.

15-2.4.1 At least two exits of the types permitted in 15-2.2, located remote from each other, shall be provided for each occupied floor of the building.

15-2.4.2 At least two exits of the type permitted in 15-2.2, located remote from each other, shall be accessible from each fire or smoke compartment.

15-2.4.3* At least one approved exit shall be accessible from each fire compartment and each required smoke compartment into which residents may be moved in a fire emergency with the exits so arranged that egress shall not require return through the zone of fire origin.

15-2.5 Arrangement of Means of Egress.

15-2.5.1 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 dayroom, group activity space, or other common spaces, may intervene. Where individual occupant sleeping rooms adjoin a dayroom or group activity space which is utilized for access to an exitway, such sleeping room may open directly to the dayroom or space and may be separated in elevation by a one-half or full-story height (also see 15-3.1.2).

15-2.5.2* Existing dead-end corridors are undesirable and shall be altered wherever possible so that exits will be accessible in at least two different directions from all points in aisles, passageways, and corridors.

15-2.5.3 A sallyport may be permitted in a means of egress where there are provisions for continuous and unobstructed travel through the sallyport during an emergency exit condition.

15-2.6 Travel Distance to Exits.

15-2.6.1 Travel distance:

(a) Between any room door required as exit access and an exit or smoke barrier shall not exceed 100 ft (30 m);

(b) Between any point in a room and an exit or smoke barrier shall not exceed 150 ft (45 m); and

(c) Between any point in a sleeping room to the door of that room shall not exceed 50 ft (15 m).

Exception No. 1: The travel distance in (a) or (b) above may be increased by 50 ft (15 m) in buildings protected throughout by an approved automatic sprinkler system or smoke control system.

Exception No. 2: The travel distance in (c) above may be increased to 100 ft (30 m) in open dormitories where the enclosing walls of the dormitory space are at least of smoketight construction. Where travel distance to the exit access door from any point within the dormitory exceeds 50 ft (15 m), at least two exit access doors remote from each other shall be provided.

15-2.7 Discharge from Exits.

15-2.7.1 Exits may discharge into a fenced or walled courtyard, provided that not more than two walls of the courtyard are the building walls from which exit is being made. Enclosed yards or courts shall be of sufficient size to accomodate all occupants, a minimum of 50 ft (15 m) from the building with a net area of 15 sq ft (1.4 sq m) per person.

15-2.7.2 All exits may discharge through the level of exit discharge. The requirements of 5-7.2 may be waived provided that not more than 50 percent of the exits discharge into a single fire compartment.

Exception: Where all exits discharge through areas on the level of discharge, a smoke barrier shall be provided to divide that level into at least two compartments with at least 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 and any other portion of the level of discharge area with access to the discharge area shall be provided with automatic sprinkler protection or separated from it in accordance with the requirements for the enclosure of exits (see 5-1.3.1).

15-2.8 Illumination of Means of Egress. Illumination shall be in accordance with Section 5-8.

15-2.9 Emergency Lighting. Emergency lighting shall be in accordance with Section 5-9.

Exception: Emergency lighting of at least 1-hour duration may be provided.

15-2.10 Marking of Means of Egress. Exit marking shall be provided in areas accessible to the public in accordance with Section 5-10.

Exception: Exit signs may be omitted in sleeping areas.

15-2.11 Special Features.

15-2.11.1 Doors within means of egress shall be as required in Chapter 5.

Exception: As noted in 15-2.11.2 through 15-2.11.8.

15-2.11.2 Doors may be locked in accordance with the applicable Use Condition.

15-2.11.3* Doors to resident sleeping rooms shall be at least 28 in. (71 cm) in clear width.

Exception: Existing doors to resident sleeping rooms housing four or less residents may be 19 in. (48.3 cm) in clear width.

15-2.11.4 Doors in a means of egress may be of the horizontal sliding type provided the force to slide the door to its fully open position does not exceed 50 lb (222 N) with a perpendicular force against the door of 50 lb (222 N).

15-2.11.5 Doors from areas of refuge to the exterior may be locked with key lock in lieu of locking methods described in 15-2.11.6. 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.

15-2.11.6* Any remote release used in means of egress shall be provided with a reliable means of operation, remote from the resident living area, to release locks on all doors.

Exception: Requirements for remote locking and unlocking may be waived provided not more than ten doors are necessary to be unlocked in order to move all occupants from one smoke compartment to an area of refuge as promptly as required for remote unlocking. The opening of all necessary doors shall be accomplished with no more than two separate keys.

15-2.11.7 All remote release operated doors shall be provided with a redundant means of operation as follows:

(a) Power-operated sliding doors or power-operated locks shall be so constructed 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 in accordance with 5-9.2.3 is provided for the power operation or a remote manual mechanical release is provided.

(b) Mechanically operated sliding doors or mechanically operated locks shall be provided with a manual mechanical means to release and open the door at the door.

15-2.11.8 The provisions of 5-2.1.5.2 for stairway reentry do not apply.

15-2.11.9 Spiral stairs meeting the requirements of 5-2.2.2.4 are permitted for access to and between staff locations.

SECTION 15-3 PROTECTION

15-3.1 Protection of Vertical Opening.

15-3.1.1 Any stairway, ramp, elevator, hoistway, light, or ventilation shaft, chute, or other vertical opening between stories shall be enclosed in accordance with Section 6-2.

Exception No. 1: Stairs that do not connect a corridor, do not connect more than two levels, and do not serve as a means of egress need not comply with these regulations.

Exception No. 2: Where full enclosure is impractical, the required enclosure may be limited to that necessary to prevent a fire originating in any story from spreading to any other story.

Exception No. 3: The fire resistance rating of enclosures in detention and correctional occupancies protected throughout by an approved automatic sprinkler system may be reduced to 1 hour.

15-3.1.2 Two full communicating floor levels are permitted without enclosure protection between levels provided all the following conditions are met:

(a) The entire normally occupied area, including all communicating floor levels, is sufficiently open and unobstructed so that it may be assumed that a fire or other dangerous condition in any part will be readily obvious to the occupants or supervisory personnel in the area.

(b) Exit capacity is sufficient to provide simultaneously for all the occupants of all communicating levels and areas, all communicating levels in the same fire area being considered as a single floor area for purposes of determination of required exit capacity.

(c) Each floor level, considered separately, has at least one-half of its individual required exit capacity accessible by exit access leading directly out of that level without transversing another communicating floor level.

15-3.1.3* A multitiered open cell block may be considered as a single-story building provided that either:

1. A smoke control system is provided (*see recommended design criteria in A-15-3.1.3*) to maintain the level of smoke filling, from potential cell fires, at least 5 ft (152.4 cm) above the floor level of any occupied tier involving space that is:

(a) Use Condition IV or 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 cell, or

2. The entire building, including cells, are provided with complete automatic sprinkler protection in accordance with 15-3.5.

15-3.2 Protection from Hazards.

15-3.2.1 An area used for general storage, boiler or furnace rooms, fuel storage, janitor's closets, maintenance shops including woodworking and painting areas, laundries and kitchens shall be separated from other parts of the building with construction having not less than a 1-hour fire resistance rating and all openings shall be protected with self-closing fire doors, or such area shall be provided with automatic sprinkler protection. Where the hazard is severe, both the 1-hour fire resistance rated separation and automatic sprinklers shall be provided.

Exception No. 1: Where cooking facilities are protected per 7-2.3, kitchens need not be provided with room-wide protection.

Exception No. 2: When, in the opinion of the authority having jurisdiction, such areas are no longer incidental to residents' housing, they shall be separated by 2-hour fire barriers in conjunction with automatic sprinkler protection.

15-3.2.2* Padded cells are severe hazard areas. Doors to padded cells shall be ¾-hour self-closing and self-latching fire door assemblies.

15-3.2.3 Cooking facilities shall be protected in accordance with 7-2.3.

15-3.3 Interior Finish.

15-3.3.1 Interior finish of walls and ceilings in corridors and exits and any space not separated from the corridors and exits by a partition capable of retarding the passage of smoke shall be Class A or B. In all other areas interior finish shall be Class A, B or C, in accordance with Section 6-5.

15-3.3.2 Interior floor finish material in corridors and exits shall be Class II in accordance with Section 6-5.

Exception: Existing floor finish material of Class A or B in

nonsprinklered buildings and Class A, B or C in sprinklered buildings, which have been evaluated based upon tests in accordance with 6-5.2.2, may be continued in use.

15-3.4 Detection, Alarm and Communications Systems.

15-3.4.1 General.

15-3.4.1.1 Detention and correctional occupancies shall be provided with a fire alarm system in accordance with Section 7-6, except as modified below.

15-3.4.1.2 All required fire alarm systems shall be electrically supervised.

Exception: Existing nonelectrically supervised systems may be allowed in buildings protected by a complete automatic extinguishing system.

15-3.4.1.3 All fire alarm systems and detection systems required in this section shall be provided with a secondary power supply and the installation shall be in accordance with NFPA 72A, *Standard for the Installation, Maintenance, and Use of Local Protective Signaling Systems.*

15-3.4.2 Initiation. Initiation of the required fire alarm system shall be by manual means, in accordance with 7-6.2, and by means of any detection devices or detection systems required.

Exception No. 1: Manual fire alarm boxes may be locked provided that staff is present within the subject area when occupied and have keys readily available to unlock the boxes.

Exception No. 2: Manual fire alarm boxes may be located in a staff location provided that the staff location is manned when the building is occupied and has direct supervision of the sleeping area.

15-3.4.3 Notification.

15-3.4.3.1 Occupant Notification. Occupant notification shall be accomplished automatically, without delay, upon operation of any fire alarm activating device by means of an internal audible general evacuation alarm in accordance with 7-6.3.

Exception No. 1: Zoned or coded systems shall be permitted.

Exception No. 2: Any smoke detectors required by this chapter may be arranged to alarm at a constantly attended location only and are not required to accomplish general alarm indication.*

15-3.4.3.2 Emergency Forces Notification. Fire department notification shall be accomplished in accordance with 7-6.4.

Exception: Any smoke detectors required by this chapter are not required to transmit an alarm to the fire department.

15-3.4.4 Detection. An approved automatic smoke detection system shall be installed, in accordance with Section 7-6, throughout all resident housing areas.

Exception No. 1: Smoke detectors may be omitted from sleeping rooms with 4 or fewer occupants in Use Condition II or III.

Exception No. 2: Smoke detectors may be omitted in sleeping rooms with 4 or fewer occupants in buildings protected throughout with an approved automatic sprinkler system installed in accordance with Section 7-7.

Exception No. 3: Other arrangements and positioning of smoke detectors may be used to prevent damage or tampering or for other purposes provided the function of detecting any fire is fulfilled and the siting of detectors is such that the speed of detection will be equivalent to that provided by the spacing and arrangements described in Section 7-6. This may include the location of detectors in exhaust ducts from cells, behind grilles, or in other locations. The equivalent performance of the design, however, must be acceptable to the authority having jurisdiction in accordance with the equivalency concepts specified in Section 1-5 of this Code.

15-3.5 Extinguishment Requirements.

15-3.5.1* When required by 15-1.6, facilities shall be protected throughout by an approved supervised automatic sprinkler system in accordance with Section 7-7.

15-3.5.2 Where exceptions are stated in the provisions of this *Code* (*including those specified in 15-3.8.1*) for detention and correctional occupancies equipped with an approved automatic extinguishing system, and where such systems are required, the systems shall be in complete accordance with Section 7-7 for systems in light hazard occupancies and shall be electrically interconnected with the fire alarm system.

15-3.5.3 The sprinkler piping, serving no more than six sprinklers for any isolated hazardous area, may be connected directly to a domestic water supply system having a capacity sufficient to provide 0.15 gal per minute per sq ft (6.1 L/min/sq m) 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. (*For sprinkler requirements for hazardous areas see 15-3.2 and for sprinkler requirements for chutes see 15-5.4.*)

15-3.5.4 Portable fire extinguishers shall be provided in accordance with 7-7.4.1.

Exception No. 1: Access to portable fire extinguishers may be locked.*

Exception No. 2: Portable fire extinguishers may be located at staff locations only.

15-3.5.5 Standpipe and hose systems shall be provided in accordance with 7-7.4.2 as follows:

(a) Class II standpipe and hose systems shall be provided for any building over two stories in height, and

(b) Standpipe and hose systems for fire department use, either Class I or III, shall be provided for all unsprinklered buildings over two stories in height.

Exception No. 1: One-inch (2.5-cm) diameter formed hose on hose reels may be used to provide Class II service.

Exception No. 2: Separate Class I and Class II systems may be used in lieu of Class III.

15-3.6 Corridors. [*See 15-3.8, Special Features (Subdivision of Resident Housing Spaces).*]

15-3.7 Subdivision of Building Spaces.

15-3.7.1* Smoke barriers shall be provided, regardless of building construction type, as follows:

(a)* To divide every story used by residents for sleeping, or any other story having an occupant load of 50 or more persons, into at least two compartments, and

(b)* To limit the travel distance to a door in a smoke barrier:

1. From any room door required as exit access to 200 ft (60 m),

2. From any point in a room to 250 ft (76 m).

Exception No. 1: Protection may be accomplished with horizontal exits (see 5-2.4).

Exception No. 2: Spaces having direct exit to (a) a public way, (b) a building separated from the resident housing area by a 2-hour fire resistance rating or 50 ft (15 m) of open space, or (c) an enclosed area having a holding space 50 ft (15 m) from the housing area that provided 6 sq ft (.56 sq m) or more of refuge area per person (resident, staff, visitors, etc.) that may be present at the time of the fire fulfills the requirement for subdivision of such spaces provided the locking arrangement of doors involved meets the requirements for doors at the compartment barrier for the Use Condition involved.

15-3.7.2* Any required smoke barrier shall be constructed in accordance with Section 6-3. Barriers shall be of substantial construction and shall have a structural fire resistance. Fixed wired glass vision panels shall be permitted in such barriers provided they do not individually exceed 1,296 sq in. (.84 sq m) in area and are mounted in approved steel frames. There is no restriction on the total number of such vision panels in any barrier, (e.g., a smoke barrier may consist of wire glass panels mounted in a security grille arrangement).

15-3.7.3 At least 6 net sq ft (.56 sq m) 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 whenever the occupants are moved across the smoke barrier in a fire emergency.

15-3.7.4 Doors in smoke barriers shall be self-closing or automatic-closing as required in 5-2.1.8. Swinging doors shall be self-latching. Such doors are not required to swing with exit travel.

15-3.7.5 Doors in smoke barriers shall provide resistance to the passage of smoke.

15-3.7.6 Vision panels of approved transparent wired glass or other material approved by the authority having jurisdiction not exceeding 1,296 sq in. (.84 sq m) in steel frames shall be provided in each door in a smoke barrier.

15-3.7.7 Smoke dampers shall be provided in accordance with 6-3.4.

Exception: Other arrangements and positioning of smoke detectors may be used to prevent damage or tampering or for other purposes provided the function of detecting any fire is fulfilled and the siting of detectors is such that the speed of detection will be equivalent to that provided by the required spacing and arrangement.

15-3.8 Special Features. (Subdivision of Resident Housing Spaces.)

15-3.8.1 Subdivision of facility spaces shall comply with Table 15-3.8.1.

Table 15-3.8.1

USE CONDITION / Feature	II		III		IV		V	
	NS	AS	NS	AS	NS	AS	NS	AS
Room to Room Separation	NR	NR	NR	NR	ST	NR	ST	ST**
Room Face to Corridor Separation	NR	NR	ST***	NR	ST***	NR	FR***	ST**
Room Face to Common Space Separation	NR	NR	NR <50 ft* (15 m) ST*** >50 ft* (15 m)	NR <50 ft* (15 m) ST** >50 ft* (15 m)	ST***	NR <50 ft* (15 m) ST** >50 ft* (15 m)	ST***	ST**
Common Space to Corridor Separation	ST	NR	ST	NR	ST	NR	FR	ST**
Total Openings in Solid Room Face	120 sq in. (.08 sq m)		120 sq in. (.08 sq m)		120 sq in. (.08 sq m)		120 sq in. (.08 sq m) Closable from inside or 120 sq in. (.08 sq m) w/smoke control	

AS — Protected by automatic sprinklers
NS — Not protected by automatic sprinklers
NR — No requirement
ST — Smoketight
FR — Fire Rated — 1 hour

*This is the travel distance through the common space to the exit access corridor.
**May be NR where there is either
(a) an approved automatic smoke detection system installed in all corridors and common spaces, or,
(b) multi-tiered cell blocks meeting the requirements of 15-3.1.3.
***May be NR in multi-tiered open cell blocks meeting the requirements of 15-3.1.3.

NOTE 1: Doors in openings in partitions required to be fire resistive by this chart in other than required enclosures of exits or hazardous areas shall be substantial doors, of construction that will resist fire for at least 20 minutes. Wire glass vision panels are permitted. Latches and door closers are not required on cell doors.

NOTE 2: Doors in openings in partitions required to be smoketight by the chart shall be substantial doors, of construction that will resist the passage of smoke. Latches and door closers are not required on cell doors.

NOTE 3: "Total Openings in Solid Room Face" includes all openings (undercuts, food passes, grilles, etc.), the total of which will not exceed 120 sq in. (.08 sq m).

NOTE 4: Under Use Condition II, III, or IV, a space housing not more than 16 persons and subdivided by open construction (any combination of grating doors and grating walls or solid walls) may be considered one room. The perimeter walls of such space shall be of smoketight construction. Smoke detection shall be provided in such space. Under Use Condition IV, common walls between sleeping areas within the space shall be smoketight and grating doors and fronts may be used.

SECTION 15-4 SPECIAL PROVISIONS

15-4.1 Windowless Buildings.

15-4.1.1 For purposes of this chapter a windowless building or portion of a building is one with nonopenable windows, windows not readily breakable, or with no windows.

15-4.1.2 Windowless buildings shall be provided with vent openings, smoke shafts, or an engineered smoke control system to provide ventilation (mechanical or natural) for each windowless smoke compartment.

15-4.2 Underground Buildings.

15-4.2.1 See Chapter 30 for requirements for underground buildings.

15-4.3 Operating Features. (*See Chapter 31.*)

SECTION 15-5 BUILDING SERVICES

15-5.1 Utilities.

15-5.1.1 Utilities shall comply with the provisions of Section 7-1.

15-5.1.2 Alarms, emergency communication systems, emergency illumination and 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 and not presenting a life safety hazard may be continued in use.

15-5.2 Heating, Ventilating and Air Conditioning.

15-5.2.1 Heating, ventilating and air conditioning equipment shall comply with the provisions of Section 7-2 and shall be installed in accordance with the manufacturer's specifications.

Exception No. 1: As modified in 15-5.2.2 following.

Exception No. 2: Systems complying with earlier editions of the applicable codes and not presenting a life safety hazard may be continued in use.

15-5.2.2 Portable space heating devices are prohibited. Any heating device other than a central heating plant shall be so designed and installed that combustible material will not be ignited by it or its appurtenances. If fuel-fired, such heating devices shall be chimmney or vent connected, shall take air for combustion directly form outside, and shall be so 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 may be used in locations other than means of egress and sleeping areas, provided such heaters are located high enough to be out of reach of persons using the area and provided they are vent connected and equipped with the safety devices called for above.

15-5.2.3 Combustion and ventilation air for boiler, incinerator or heater rooms shall be taken directly from and discharged directly to the outside air.

15-5.3 Elevators, dumbwaiters and vertical conveyors shall comply with the provisions of Section 7-4.

15-5.4 Rubbish Chutes, Incinerators and Laundry Chutes.

15-5.4.1 Rubbish chutes, incinerators and laundry chutes shall comply with the provisions of Section 7-5.

15-5.4.2 Any rubbish chute or linen chute, including pneumatic rubbish and linen systems, shall be provided with automatic extinguishing protection installed in accordance with Section 7-7.

15-5.4.3 Any trash chute shall discharge into a trash collecting room used for no other purpose and protected in accordance with Section 6-4.

15-5.4.4 Any incinerator shall not be directly flue-fed nor shall any floor chute directly connect with the combustion chamber.

CHAPTER 16 NEW HOTELS AND DORMITORIES

(See also Chapter 31.)

SECTION 16-1 GENERAL REQUIREMENTS

16-1.1 Application.

16-1.1.1 This chapter establishes life safety requirements for all new hotels and for modified buildings according to the provisions of Section 1-4. *(See Chapter 31 for operating features.)*

16-1.1.2 New dormitories shall comply with the requirements for new hotels.

Exception: Any dormitory divided into suites of rooms, with one or more bedrooms opening into a living room or study which has a door opening into a common corridor serving a number of suites, shall be classified as an apartment building.

16-1.2 Mixed Occupancies.

16-1.2.1 Where another type of occupancy occurs in the same building as a residential occupancy, the requirements of 1-4.7 of this *Code* shall be applicable.

16-1.2.2 For requirements on mixed mercantile and residential occupancies, see 24-1.2.

16-1.2.3 Any ballroom, assembly or exhibition hall, and other space used for purposes of public assembly shall be in accordance with Chapter 8. Any dining area having a capacity of 50 or more persons shall be treated as an assembly occupancy.

16-1.3 Definitions.

16-1.3.1 Terms applicable to this chapter are defined in Chapter 3 of this *Code*; where necessary, other terms will be defined in the text as they may occur.

Dormitories. Includes buildings or spaces in buildings where group sleeping accommodations are provided for more than 16 persons not members of the same family group in one room or in a series of closely associated rooms under joint occupancy and single management, as in college dormitories, fraternity houses, military barracks; with or without meals, but without individual cooking facilities.

Hotels. Includes buildings or groups of buildings under the same management in which there are more than 16 sleeping accommodations for hire, primarily used by transients who are lodged with or without meals, whether designated as a hotel, inn, club, motel, or by any other name. So-called apartment hotels shall be classified as hotels because they are potentially subject to transient occupancy like that of hotels.

Mezzanine. An intermediate level between the floor and ceiling of any story and covering not more than one-third of the floor area of the room in which it is located.

16-1.4 Classification of Occupancy. *(See 16-1.3.)*

16-1.5 Classification of Hazard of Contents.

16-1.5.1* Building contents shall be classified according to the provisions of 4-2.1 of this *Code*. For design of sprinkler systems, the classification of contents in NFPA 13, *Standard for the Installation of Sprinkler Systems*, shall apply.

16-1.6 Minimum Construction Requirements. No Special Requirements.

16-1.7 Occupant Load.

16-1.7.1* The occupant load in numbers of persons for whom exits are to be provided shall be determined on the basis of one person per 200 sq ft (18.6 sq m) gross floor area, or the maximum probable population of any room or section under consideration, whichever is greater. The occupant load of any open mezzanine or balcony shall be added to the occupant load of the floor below for the purpose of determining exit capacity.

SECTION 16-2 MEANS OF EGRESS REQUIREMENTS

16-2.1 General.

16-2.1.1 Any floor below the level of exit discharge occupied for public purposes shall have exits arranged in accordance with 16-2.4.1 and 16-2.6.1.

16-2.1.2 Any floor below the level of exit discharge not open to the public and used only for mechanical equipment, storage, and service operations (other than kitchens which are considered part of the hotel occupancy) shall have exits appropriate to its actual occupancy in accordance with other applicable sections of the *Code*.

16-2.1.3* The same stairway or other exit required to serve any one upper floor may also serve other upper floors.

Exception: No inside open stairway or ramp may serve as a required egress from more than one floor, unless it conforms with 6-2.2.3.4.

16-2.2 Types of Exits.

16-2.2.1 Exits, or exit components, arranged in accordance with Chapter 5, shall be of one or more of the following types:

(a) Doors, as per 5-2.1.

(b) Revolving doors, in accordance with 5-2.1.10.

(c) Doors to subways, only if the subway meets the requirements of exit passageways as specified in 5-2.6.

(d) Stairs, in accordance with 5-2.2.

(e) Smokeproof enclosures, in accordance with 5-2.3.

(f) Horizontal exits, in accordance with 5-2.4.

(g) Ramps, Class A or Class B, in accordance with 5-2.5.

(h) Exit passageways, in accordance with 5-2.6.

16-2.3 Capacity of Means of Egress.

16-2.3.1 The capacity of means of egress shall be in accordance with Section 5-3.

16-2.3.2* Street-floor exits shall provide units of exit width, as follows, occupant load being determined in accordance with 16-1.7.

(a) One unit for each 100 persons street floor capacity for doors and other level exits, including those 24 in. (61 cm) or three risers above or below ground level.

(b) One unit for each 75 persons street-floor capacity for stair or other exit requiring descent to ground level.

(c) One and one-half units for each two-unit required stair from upper floors discharging through the street floor.

(d) One and one-half exit units for each two-unit required stair from floors below the street floor discharging through the street floor.

16-2.3.3 Every floor below the level of exit discharge shall have exits sufficient to provide for the occupant load of that floor as determined in accordance with 16-1.7 on the basis of 100 persons per exit unit for travel on the same level, 75 persons for upward travel, as up stairs.

16-2.3.4 Upper-floor exits shall provide numbers of units of exit width sufficient to meet the requirements of 16-2.3.1.

16-2.4 Number of Exits.

16-2.4.1 Not less than two exits shall be accessible from every floor, including floors below the level of exit discharge and occupied for public purposes.

16-2.5 Arrangement of Exits.

16-2.5.1 Access to all required exits shall be in accordance with Section 5-5.

16-2.5.2 Exits shall be so arranged that, from any corridor room door, exits will be accessible in at least two different directions.

Exception: Up to the first 35 ft (10.7 m) of exit travel from a corridor room door may be along a corridor with exit access only in one direction (dead end).

16-2.5.3 Any room, or any suite of rooms, in excess of 2,000 sq ft (185 sq m) shall be provided with at least two exit access doors remote from each other.

16-2.6 Travel Distance to Exits.

16-2.6.1 Any exit as indicated in 16-2.4.1 shall be such that it will not be necessary to travel more than 100 ft (30 m) from the door of any room to reach the nearest exit. Travel distance to exits shall be measured in accordance with Section 5-6.

Exception No. 1: Travel distance to exits may be increased to 200 ft (60 m) for exterior ways of exit access arranged in accordance with 5-5.3.

Exception No. 2: Travel distance to exits may be increased to 150 ft (45 m) if the exit access and any portion of the building which is tributary to the exit access are protected throughout by an approved automatic sprinkler system. In addition, the portion of the building in which the 150-ft (45-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 up to four stories in height, and 2 hours for buildings four or more stories in height.

16-2.6.2 Travel distance from the door of a room in a suite or living unit to a corridor door shall not exceed 50 ft (15 m).

Exception: One-hundred-ft (30-m) travel distance is allowed in buildings protected throughout by an approved automatic sprinkler system in accordance with Section 7-7, or an approved single station smoke detector in each habitable area in the suite or living unit. (See also 16-3.4.4.2.)

16-2.7 Discharge from Exits.

16-2.7.1 At least half of the required number of units of exit width from upper floors, exclusive of horizontal exits, shall lead directly to the street or through a yard, court, or passageway with protected openings and separated from all parts of the interior of the building.

16-2.7.2 A maximum of 50 percent of the exits may discharge through areas on the floor of exit discharge in accordance with 5-7.2.

16-2.8 Illumination of Means of Egress.

16-2.8.1 Means of egress shall be illuminated in accordance with Section 5-8.

16-2.9 Emergency Lighting.

16-2.9.1 Emergency lighting in accordance with Section 5-9 shall be provided in all buildings with more than 25 rooms.

Exception: Where each guest room has a direct exit to the outside of the building at ground level (as in motels), no emergency lighting shall be required.

16-2.10 Marking of Means of Egress.

16-2.10.1 Means of egress shall be marked in accordance with Section 5-10.

16-2.11 Special Features.

16-2.11.1* No door in any means of egress shall be locked against egress when the building is occupied.

16-2.11.2* Every stairwell door shall allow reentry from the stairwell to the interior of the building or an automatic release shall be provided to unlock all stairwell doors to allow reentry. Such automatic release shall be actuated with the initiation of the building fire alarm system. Also, they shall unlock upon loss of power controlling the lock or locking mechanism.

SECTION 16-3 PROTECTION

16-3.1 Protection of Vertical Openings.

16-3.1.1 Every stairway, elevator shaft and other vertical opening shall be enclosed or protected in accordance with 6-2.2.

Exception No. 1: Unprotected vertical openings connecting not more than three floors may be permitted in accordance with the conditions of 6-2.2.3.4.

Exception No. 2: An atrium may be utilized in accordance with 6-2.2.3.5.

Exception No. 3: Stairway enclosures shall not be required where a one-story stair connects two levels within a single dwelling unit, guest room or suite.

16-3.1.2* Any required exit stair which is so located 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 the lobby level, or to a mezzanine within the lobby (*see 16-2.7*).

16-3.1.3 No floor below the level of exit discharge, used only for storage, heating equipment, or other purposes other than residential occupancy shall have unprotected openings to floors used for residential purposes.

16-3.2 Protection from Hazards.

16-3.2.1 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 6-4.

16-3.2.2 Every hazardous area shall be separated from other parts of the building by construction having a fire resistance rating of at least 1 hour and communicating openings shall be protected by approved self-closing fire doors, or such area shall be equipped with automatic fire extinguishing system. Hazardous areas include, but are not limited to:

Boiler and heater rooms	Rooms or spaces used for storage of combustible supplies and equipment in quantities deemed hazardous by the authority having jurisdiction.
Laundries	
Repair shops	

16-3.3 Interior Finish.

16-3.3.1 Interior finish on walls and ceilings, in accordance with Section 6-5, shall be as follows:

(a) Vertical exits [*see 5-1.2.1(b)*] — Class A.

(b) Exit access [*see 5-1.2.1(a)*] — Class A or B.

(c) Lobbies, corridors that are not exit access — Class A or B.

(d) Places of assembly (*see 8-3.3*).

(e) Individual guest rooms and other rooms — Class A, B, or C.

16-3.3.2 Interior floor finish in corridors and exits shall be Class I or Class II in accordance with Section 6-5.

16-3.4 Detection, Alarm and Communications Systems.

16-3.4.1 General. A fire alarm system in accordance with Section 7-6 shall be provided.

16-3.4.2 Initiation. Initiation of the required fire alarm system shall be by:

(a) Manual means in accordance with 7-6.2, and

(b) A manual fire alarm station located at the hotel desk or other convenient central control point under continuous supervision of responsible employees, and

(c) Any automatic sprinkler system, and

(d) Any required automatic detection system.

Exception to (d): Sleeping room smoke detectors are not required to initiate the building fire alarm system.

16-3.4.3 Notification.

16-3.4.3.1 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 greater than two stories in height and with not more than 50 rooms.

16-3.4.3.2 Occupant notification shall be provided automatically, without delay, by internal audible alarm in accordance with 7-6.3.

Exception: A presignal system (see Exception to 7-6.3.2) may be used only in buildings protected throughout by an approved automatic sprinkler system and then only when permitted by the authority having jusisdiction.

16-3.4.3.3 In buildings greater than six stories in height occupant notification also shall be provided by an approved means of voice communication in accordance with 7-6.3.

16-3.4.3.4* Provisions shall be made for the immediate notification of the public fire department by either telephone or other means in case of fire. Where there is no public fire department this notification shall go to the private fire brigade.

16-3.4.4 Detection.

16-3.4.4.1 A corridor smoke detection system in accordance with Section 7-6 shall be provided.

Exception: Buildings protected throughout by an approved automatic sprinkler system.

16-3.4.4.2 Each sleeping room shall be provided with an approved single station smoke detector, in accordance with 7-6.2.7, powered from the building electrical service.

Exception: Single station smoke detection shall not be required when sleeping rooms contain smoke detectors connected to a central alarm system which also alarm locally.

16-3.5 Extinguishment Requirements.

16-3.5.1 Where an automatic sprinkler system is installed, either for total or partial building coverage, the system shall be in accordance with Section 7-7.

Exception: Sprinkler installation may be omitted in small compartmented areas such as closets not over 24 sq ft (2.2 sq m) and bathrooms not over 55 sq ft (5.1 sq m).

16-3.5.2 Portable fire extinguishers shall be provided in hazardous areas. When provided, portable fire extinguishers shall be installed and maintained in accordance with 7-7.4.1.

16-3.6 Minimum Fire Resistance Requirements for Protection of Guest Rooms (Corridors).

16-3.6.1 Every interior corridor shall be separated from guest rooms by partitions having at least a 1-hour fire resistance rating.

Exception: Buildings protected throughout by an approved automatic sprinkler system may have partitions having a ½-hour fire resistance rating.

16-3.6.2 Each guest room door which opens onto an interior corridor shall have a fire protection rating of at least 20 minutes. Openings shall resist the passage of smoke.

16-3.6.3 Doors between guest rooms and corridors shall be self-closing, and shall meet the requirements of 16-3.6.2.

16-3.6.4 Unprotected openings shall be prohibited in partitions of corridors serving as exit access from guest rooms.

16-3.6.5 No transom shall be installed in partitions of sleeping rooms.

16-3.7 Subdivision of Building Spaces.

16-3.7.1 Every guest room floor shall be divided into at least two smoke compartments of approximately the same size, with smoke barriers in accordance with Section 6-3. Smoke dampers are not required.

Additional smoke barriers shall be provided such that the maximum travel distance from a guest room corridor door to a smoke barrier shall not exceed 150 ft (45 m).

Exception No. 1: In buildings protected throughout by an approved automatic sprinkler system in accordance with Section 7-7.

Exception No. 2: Where each guest room is provided with exterior ways of exit access arranged in accordance with 5-5.3.

Exception No. 3: Smoke barriers are not required where the aggregate corridor length on each floor is not more than 150 ft (45 m).

16-3.8 Special Features.

16-3.8.1* Smokeproof enclosures shall be provided in accordance with 5-2.3 in buildings greater than six stories in height.

Exception: Buildings protected throughout by an approved automatic sprinkler system in accordance with Section 7-7.

SECTION 16-4 SPECIAL PROVISIONS

16-4.1* Operable Windows. Each guest room shall be provided with at least one outside window. Such windows shall be openable from the inside, without the use of tools, and provide a clear opening of not less than 20 in. (50.8 cm) in width, 24 in. (61 cm) in height, and 5.7 sq ft (.53 sq m) in area. The bottom of the opening shall not be more than 44 in. (112 cm) above the floor. In rooms located greater than six stories above grade the openable clear height, width, and area of the window may be modified to the dimensions necessary for ventilation.

Exception No. 1: Buildings protected throughout by an approved supervised automatic sprinkler system in accordance with Section 7-7.

Exception No. 2: When a guest room has a door leading directly to the outside of building.

Exception No. 3: Buildings provided with an approved engineered smoke control system in accordance with Section 7-3.

16-4.2 Operating Features. (*See Chapter 31.*)

SECTION 16-5 BUILDING SERVICES

16-5.1 Utilities. Utilities shall comply with the provisions of Section 7-1.

16-5.2 Heating, Ventilating, and Air Conditioning. Heating, ventilating and air conditioning equipment shall comply with the provisions of Section 7-2, except as otherwise required in this chapter.

16-5.3* Elevators, Dumbwaiters and Vertical Conveyors. Elevators, dumbwaiters, and vertical conveyors shall comply with the provisions of Section 7-4. In buildings greater than six stories one elevator shall be provided with a protected power supply and be available for use by the fire department in case of emergency.

16-5.4 Rubbish Chutes, Incinerators, and Laundry Chutes. Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 7-5.

CHAPTER 17 EXISTING HOTELS AND DORMITORIES

(See also Chapter 31.)

SECTION 17-1 GENERAL REQUIREMENTS

17-1.1 Application.

17-1.1.1 This chapter establishes life safety requirements for all existing hotels. *(See Chapter 31 for operating features.)*

17-1.1.2 Existing dormitories shall comply with the requirements for existing hotels.

Exception: Any dormitory divided into suites of rooms, with one or more bedrooms opening into a living room or study which has a door opening into a common corridor serving a number of suites, shall be classified as an apartment building.

17-1.2 Mixed Occupancies.

17-1.2.1 Where another type of occupancy occurs in the same building as a residential occupancy, the requirements of 1-4.7 of this *Code* shall be applicable.

17-1.2.2 For requirements on mixed mercantile and residential occupancies, see 25-1.2.

17-1.2.3 Any ballroom, assembly or exhibition hall, and other space used for purposes of public assembly shall be in accordance with Chapter 9. Any dining area having a capacity of 50 or more persons shall be treated as an assembly occupancy.

17-1.3 Definitions.

17-1.3.1 Terms applicable to this chapter are defined in Chapter 3 of this *Code*; where necessary, other terms will be defined in the text as they may occur.

Dormitories. Includes buildings or spaces in buildings where group sleeping accommodations are provided for more than 16 persons not members of the same family group in one room or in a series of closely associated rooms under joint occupancy and single management, as in college dormitories, fraternity houses, military barracks; with or without meals, but without individual cooking facilities.

Hotels. Includes buildings or groups of buildings under the same management in which there are more than 16 sleeping accommodations for hire, primarily used by transients who are lodged with or without meals, whether designated as a hotel, inn, club, motel, or by any other name. So-called apartment hotels shall be classified as hotels because they are potentially subject to transient occupancy like that of hotels.

Mezzanine. An intermediate level between the floor and ceiling of any story and covering not more than one-third of the floor area of the room in which it is located.

17-1.4 Classification of Occupancy. *(See 17-1.3.)*

17-1.5 Classification of Hazard of Contents.

17-1.5.1* Building contents shall be classified according to the provisions of 4-2.1 of this *Code*. For design of sprinkler systems, the classification of contents in NFPA 13, *Standard for the Installation of Sprinkler Systems*, shall apply.

17-1.6 Minimum Construction Requirements. No Special Requirements.

17-1.7 Occupant Load.

17-1.7.1* The occupant load in numbers of persons for whom exits are to be provided shall be determined on the basis of one person per 200 sq ft (18.6 sq m) gross floor area, or the maximum probable population of any room or section under consideration, whichever is greater. The occupant load of any open mezzanine or balcony shall be added to the occupant load of the floor below for the purpose of determining exit capacity.

SECTION 17-2 MEANS OF EGRESS REQUIREMENTS

17-2.1 General.

17-2.1.1 Any floor below the level of exit discharge occupied for public purposes shall have exits arranged in accordance with 17-2.4.1 and 17-2.6.1.

17-2.1.2 Any floor below the level of exit discharge not open to the public and used only for mechanical equipment, storage, and service operations (other than kitchens which are considered part of the hotel occupancy) shall have exits appropriate to its actual occupancy in accordance with other applicable sections of this *Code*.

17-2.1.3* The same stairway or other exit required to serve any one upper floor may also serve other upper floors.

Exception: No inside open stairway, escalator, or ramp may serve as a required egress from more than one floor, unless it conforms to 6-2.2.3.4.

17-2.2 Types of Exits.

17-2.2.1 Exits or exit components, arranged in accordance with Chapter 5, shall be of one or more of the following types:

(a) Doors, as per 5-2.1.

(b) Revolving doors, in accordance with 5-2.1.10.

(c) Doors to subways only if the subway meets the requirements of exit passageways as specified in 5-2.6.

(d) Stairs, Class A or Class B, in accordance with 5-2.2.

(e) Smokeproof enclosures, in accordance with 5-2.3.

(f) Horizontal exits, in accordance with 5-2.4.

(g) Ramps, Class A or Class B, in accordance with 5-2.5.

(h) Exit passageways, in accordance with 5-2.6.

(i) Fire escape stairs, in accordance with 5-2.8.

17-2.2.2* Escalators previously approved as a component in the means of egress may continue to be given credit.

17-2.3 Capacity of Means of Egress.

17-2.3.1 The capacity of means of egress shall be in accordance with Section 5-3.

17-2.3.2* Street-floor exits shall provide units of exit width as follows, occupant load being determined in accordance with 17-1.7.

(a) One unit for each 100 persons street-floor capacity for doors and other level exits, including those 24 in. (61 cm) or three risers above or below ground level.

(b) One unit for each 75 persons street-floor capacity for stair or other exit requiring descent to ground level.

(c) One and one-half exit units for each two-unit required stair from upper floors discharging through the street floor.

(d) One and one-half exit units for each two-unit required stair from floors below the street floor discharging through the street floor.

17-2.3.3 Every floor below the level of exit discharge shall have exits sufficient to provide for the occupant load of that floor as determined in accordance with 17-1.7 on the basis of 100 persons per exit unit for travel on the same level, 75 persons for upward travel, as up stairs.

17-2.3.4 Upper-floor exits shall provide numbers of units of exit width sufficient to meet the requirements of 17-2.3.1.

17-2.4 Number of Exits.

17-2.4.1 Not less than two exits shall be accessible from every floor, including floors below the level of exit discharge and occupied for public purposes.

17-2.5 Arrangement of Exits.

17-2.5.1 Access to all required exits shall be in accordance with Section 5-5.

17-2.5.2 Exits shall be so arranged that, from any corridor room door, exits will be accessible in at least two different directions.

Exception: Up to the first 35 ft (10.7 m) of exit travel from a corridor room door may be along a corridor with exit access only in one direction (dead end).

17-2.6 Travel Distance to Exits.

17-2.6.1 Any exit as indicated in 17-2.4.1 shall be such that it will not be necessary to travel more than 100 ft (30 m) from the door of any room to reach the nearest exit. Travel distance to exits shall be measured in accordance with Section 5-6.

Exception No. 1: Travel distance to exits may be increased to 200 ft (60 m) for exterior ways of exit access arranged in accordance with 5-5.4.

Exception No. 2: Travel distance to exits may be increased to 150 ft (45 m) if the exit access and any portion of the building which is tributary to the exit access are protected throughout by an approved automatic sprinkler system. In addition, the portion of the building in which the 150-ft (45-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 up to four stories in height, and 2 hours for buildings four or more stories in height.

17-2.6.2 Travel distance from the door of the most remote room in a suite or in an apartment to a corridor door shall not exceed 50 ft (15 m).

Exception: One-hundred-ft (30-m) travel distance is allowed in buildings protected throughout by an approved automatic sprinkler system in accordance with Section 7-7, or an approved single station smoke detector in each habitable area in the suite or living unit. (See also 17-3.4.4.2.)

17-2.7 Discharge from Exits.

17-2.7.1 At least half of the required number of units of exit width from upper floors, exclusive of horizontal exits, shall lead directly to the street or through a yard, court, or passageway with protected openings and separated from all parts of the interior of the building.

17-2.7.2 If any exits discharge through areas on the level of exit discharge, the conditions of 5-7.2 shall be met.

17-2.8 Illumination of Means of Egress.

17-2.8.1 Means of egress shall be illuminated in accordance with Section 5-8.

17-2.9 Emergency Lighting.

17-2.9.1 Emergency lighting in accordance with Section 5-9 shall be provided in all buildings with more than 25 rooms.

Exception: Where each guest room has a direct exit to the outside of the building at ground level (as in motels), no emergency lighting shall be required.

17-2.10 Marking of Means of Egress.

17-2.10.1 Means of egress shall be marked in accordance with Section 5-10.

17-2.11 Special Features.

17-2.11.1* No door in any means of egress shall be locked against egress when the building is occupied.

17-2.11.2* Every stairwell door shall allow reentry from the stairwell to the interior of the building or an automatic release shall be provided to unlock all stairwell doors to allow reentry. Such automatic release shall be actuated with the initiation of the building fire alarm system. Also, they shall unlock upon loss of power controlling the lock or locking mechanism.

SECTION 17-3 PROTECTION

17-3.1 Protection of Vertical Openings.

17-3.1.1 Every stairway, elevator shaft and other vertical opening shall be enclosed or protected in accordance with 6-2.2 or provide means of satisfying the requirements of Section 2-9.

Exception No. 1: Unprotected vertical openings connecting not more than three floors may be permitted in accordance with the conditions of 6-2.2.3.4.

Exception No. 2: An atrium may be utilized in accordance with 6-2.2.3.5.

Exception No. 3: Stairway enclosures shall not be required where a one-story stair connects two levels within a single dwelling unit, guest room or suite.

Exception No. 4: In any building protected throughout by an approved automatic sprinkler system in accordance with Section 7-7, and where 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 not part of required exits may be waived by the authority having jurisdiction to such extent as such openings do not endanger required means of egress.

Exception No. 5: In existing buildings not more than two stories in height unprotected openings may be permitted by the authority having jurisdiction if the building is protected throughout by an approved automatic sprinkler system in accordance with Section 7-7.

17-3.1.2* Any required exit stair which is so located 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 the lobby level, or to a mezzanine within the lobby (*see 17-2.7*).

17-3.1.3 No floor below the level of exit discharge, used only for storage, heating equipment, or other purposes other than residential occupancy shall have unprotected openings to floors used for residential purposes.

17-3.2 Protection from Hazards.

17-3.2.1 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 6-4.

17-3.2.2 Every hazardous area shall be separated from other parts of the building by construction having a fire resistance rating of at least 1 hour and communicating openings shall be protected by approved self-closing fire doors, or such area shall be equipped with automatic fire extinguishing system. Hazardous areas include, but are not limited to:

Boiler and heater rooms	Rooms or spaces used for storage of combustible supplies and equipment in quantities deemed hazardous by the authority having jurisdiction.
Laundries	
Repair shops	

17-3.3 Interior Finish.

17-3.3.1 Interior finish on walls and ceilings, in accordance with Section 6-5, shall be as follows:

(a) Vertical exits [*see 5-1.2.1(b)*] — Class A or B.

(b) Exit access [*see 5-1.2.1(a)*] — Class A or B.

(c) Lobbies, corridors that are not exit access — Class A, B, or C.

(d) Places of assembly (*see 9-3.3*).

(e) Individual guest rooms and other rooms — Class A, B, or C.

17-3.3.2 Interior floor finish in corridors and exit shall be Class I or Class II in accordance with Section 6-5.

Exception: Previously installed floor coverings may be continued in use, subject to the approval of the authority having jurisdiction.

17-3.4 Detection, Alarm and Communications Systems.

17-3.4.1 General. A fire alarm system in accordance with Section 7-6, except as modified below, shall be provided.

Exception: Buildings where each guest room has exterior exit access in accordance with 5-5.3 and the building is not greater than 3 stories in height.

17-3.4.2 Initiation. Initiation of the required fire alarm system shall be by:

(a) Manual means in accordance with 7-6.2, and

Exception to (a): Manual means, as specified in 7-6.2, in excess of the alarm station at the hotel desk per (b) below, may be waived where there are other effective means (such as complete automatic sprinkler or automatic detection systems) for notification of fire as required.

(b) A manual fire alarm station located at the hotel desk or other convenient central control point under continuous supervision of responsible employees, and

(c) Any required automatic sprinkler system, and

(d) Any required detection system.

Exception to (d): Sleeping room smoke detectors are not required to initiate the building fire alarm system.

17-3.4.3 Notification.

17-3.4.3.1 Occupant notification shall be provided automatically, without delay, by internal audible alarm in accordance with 7-6.3.

Exception: A presignal system (see Exception to 7-6.3.2) may be used only when permitted by the authority having jurisdiction.

17-3.4.3.2* Provisions shall be made for the immediate notification of the public fire department by either telephone or other means in case of fire. Where there is no public fire department, this notification shall go to the private fire brigade.

17-3.4.4 Detection. Each sleeping room shall be provided with an approved single station smoke detector, in accordance with 7-6.2.7, powered from the building electrical service.

Exception: Buildings having a corridor detection system, in accordance with Section 7-6, connected to the building fire alarm system.

17-3.5 Extinguishment Requirements.

17-3.5.1 Where an automatic sprinkler system is installed, either for total or partial building coverage, the system shall be in accordance with Section 7-7.

Exception: Sprinkler installation may be omitted in small compartmented areas such as closets not over 24 sq ft (2.2 sq m) and bathrooms not over 55 sq ft (5.1 sq m).

17-3.5.2 Portable fire extinguishers shall be provided in hazardous areas. When provided, portable fire extinguishers shall be installed and maintained in accordance with 7-7.4.1.

17-3.6 Minimum Fire Resistance Requirements for Protection of Guest Rooms (Corridors).

17-3.6.1 Fire resistance for interior corridors shall be 30 minutes.

Exception No. 1: Where a corridor sprinkler system is provided as outlined in 19-3.5.1 through 19-3.5.3, in which case there will be no fire resistance rating required, but all openings shall resist the passage of smoke.

Exception No. 2: Where interior corridor walls have openings from transfer grilles, see 17-3.6.6.

17-3.6.2 Each guest room door which opens onto an interior corridor shall have a fire protection rating of at least 20 minutes.

Exception No. 1: Previously approved 1¾-in. (4.45-cm) solid bonded wood core doors may remain in use.

Exception No. 2: In buildings protected throughout by an approved automatic sprinkler system, doors shall be so constructed as to resist the passage of smoke. Doors shall be equipped with latches for keeping doors tightly closed, but may be provided with glass vision panels without restriction.

17-3.6.3 Doors between guest rooms and corridors shall be self-closing, and shall meet the requirements of 17-3.6.2.

17-3.6.4 Unprotected openings shall be prohibited in partitions of interior corridors serving as exit access from guest rooms.

17-3.6.5 Existing transoms installed in corridor partitions of sleeping rooms shall be fixed in the closed position and shall be covered or otherwise protected to provide a fire resistance rating at least equivalent to that of the wall in which they are installed.

17-3.6.6 Transfer grilles, whether protected by fusible link operated dampers or not, shall not be used in these walls or doors.

Exception No. 1: Where a corridor smoke detection system is provided which when sensing smoke will sound the building alarm and shut down return or exhaust fans which draw air into the corridor from the guest rooms. The grilles shall be located in the lower one-third of the wall or door height.

Exception No. 2: Where automatic sprinkler protection is provided in the corridor in accordance with 19-3.5.1 and where the transfer grille is located in the lower one-third of the wall or door height.

17-3.7 Subdivision of Building Spaces.

17-3.7.1 Every guest room floor shall be divided into at least two smoke compartments of approximately the same size with smoke barriers in accordance with Section 6-3. Smoke dampers are not required.

Additional smoke barriers shall be provided such that the maximum travel distance from a guest room corridor door to a smoke barrier shall not exceed 150 ft (45 m).

Exception No. 1: In buildings protected throughout with an approved automatic sprinkler system or a sprinkler system conforming to 18-3.5.1 through 18-3.5.3.

Exception No. 2: Where each guest room is provided with exterior ways of exit access arranged in accordance with 5-5.3.

Exception No. 3: Smoke barriers are not required where the aggregate corridor length on each floor is not more than 150 ft (45 m).

17-3.8 Special Features.

17-3.8.1 Smokeproof enclosures, if provided, shall comply with 5-2.3.

SECTION 17-4 SPECIAL PROVISIONS

17-4.1 Operating Features. (*See Chapter 31.*)

SECTION 17-5 BUILDING SERVICES

17-5.1 Utilities. Utilities shall comply with the provisions of Section 7-1.

17-5.2 Heating, Ventilating and Air Conditioning. Heating, ventilating and air conditioning equipment shall comply with the provisions of Section 7-2, except as otherwise required in this chapter.

17-5.3 Elevators, Dumbwaiters, and Vertical Conveyors. Elevators, dumbwaiters and vertical conveyors shall comply with the provisions of Section 7-4.

17-5.4 Rubbish Chutes, Incinerators, and Laundry Chutes. Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 7-5.

CHAPTER 18 NEW APARTMENT BUILDINGS

(See also Chapter 31.)

SECTION 18-1 GENERAL REQUIREMENTS

18-1.1 Application.

18-1.1.1 All new buildings classified as apartment buildings by 18-1.3.1 shall conform to the provisions of this chapter, and shall meet the requirements of one of the following options (*see Table 18-1*):

Option 1: Buildings without fire suppression or detection systems;

Option 2: Buildings provided with a complete automatic fire detection and notification system;

Option 3: Buildings provided with automatic sprinkler protection in selected area;

Option 4: Buildings protected throughout by an approved automatic sprinkler system.

18-1.1.2 Every individual living unit covered by this chapter shall at least comply with the minimum provisions of Section 22-2 for one- and two-family dwellings.

18-1.2 Mixed Occupancies.

18-1.2.1 Where another type of occupancy occurs in the same building as a residential occupancy, the requirements of 1-4.7 of this *Code* shall be applicable.

18-1.2.2 For requirements on mixed mercantile and residential occupancies, see 24-1.2.

18-1.3 Definitions.

18-1.3.1 Terms applicable to this chapter are defined in Chapter 3 of this *Code*; where necessary, other terms will be defined in the text as they may occur.

Apartment Buildings. Includes buildings containing three or more living units with independent cooking and bathroom facilities, whether designated as apartment house, tenement, garden apartment, or by any other name.

Mezzanine. An intermediate level between the floor and ceiling of any story and covering not more than one-third of the floor area of the room in which it is located.

18-1.4 Classification of Occupancy. *(See 18-1.3.1.)*

18-1.5 Classification of Hazard of Contents.

18-1.5.1* Building contents shall be classified according to the provisions of 4-2.1 of this *Code*. For design of sprinkler systems, the classification of contents in NFPA 13, *Standard for the Installation of Sprinkler Systems*, shall apply.

18-1.6 Minimum Construction Requirements. No Special Requirements.

18-1.7 Occupant Load.

18-1.7.1* The occupant load in numbers of persons for whom exits are to be provided shall be determined on the basis of one person per 200 sq ft (18.6 sq m) gross floor area, or the maximum probable population of any room or section under consideration, whichever is greater. The occupant load of any open mezzanine or balcony shall be added to the occupant load of the floor below for the purpose of determining exit capacity.

SECTION 18-2 MEANS OF EGRESS REQUIREMENTS

18-2.1 General.

18-2.2 Types of Exits.

18-2.2.1 Exits, or exit components, arranged in accordance with Chapter 5, shall be of one or more of the following types:

(a) Doors, as per 5-2.1.

(b) Revolving doors, in accordance with 5-2.1.10.

(c) Doors to subways, only if the subway meets the requirements of exit passageways as specified in 5-2.6.

(d) Stairs, in accordance with 5-2.2.

(e) Smokeproof enclosures, in accordance with 5-2.3.

(f) Horizontal exits, in accordance with 5-2.4.

(g) Ramps, Class A or Class B, in accordance with 5-2.5.

(h) Exit passageways, in accordance with 5-2.6.

18-2.3 Capacity of Means of Egress.

18-2.3.1 The capacity of means of egress shall be in accordance with Section 5-3.

18-2.3.2* Street-floor exits shall provide units of exit width, as follows, occupant load being determined in accordance with 18-1.7.

(a) One unit for each 100 persons street-floor capacity for doors and other level exits, including those 24 in. (61 cm) or three risers above or below ground level.

(b) One unit for each 75 persons street-floor capacity for stair or other exit requiring descent to ground level.

(c) One and one-half units for each two-unit required stair from upper floors discharging through the street floor.

(d) One and one-half exit units for each two-unit required stair from floors below the street floor discharging through the street floor.

18-2.3.3 Every floor below the level of exit discharge shall have exits sufficient to provide for the occupant load of that floor as determined in accordance with 18-1.7 on the basis of 100 persons per exit unit for travel on the same level, 75 persons for upward travel, as up stairs.

18-2.3.4 Upper-floor exits shall provide numbers of units of exit width sufficient to meet the requirements of 18-2.3.1.

18-2.4 Number of Exits.

18-2.4.1 Every living unit shall have access to at least two separate exits remote from each other as required by 5-5.1.

Exception No. 1: Any living unit which has an exit directly to the street or yard at ground level or by way of an outside stairway, or an enclosed stairway with fire resistance rating of 1 hour or more serving that apartment only and not communicating with any floor below the level of exit discharge

or other area not a part of the apartment served, may have a single exit.

Exception No. 2: A building of any height with not more than four living units per floor with a smokeproof tower or outside stair in accordance with the requirements of 5-2.3 as the exit, immediately accessible to all living units served thereby, may have a single exit. ["Immediately accessible" means there is not more than 20 ft (6.1 m) of travel distance to reach an exit from the entrance door of any living unit.]

Exception No. 3: Any building three stories or less in height with ¾-hour horizontal and vertical separation between living units may have a single exit, under the following conditions:

(a) The stairway is completely enclosed by barriers having a fire resistance rating of at least 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 ½ story below the level of exit discharge.

(c) All corridors serving as access to exits have at least a 1-hour fire resistance rating.

(d) There is not more than 35 ft (10.7 m) of travel distance to reach an exit from the entrance door of any living unit.

18-2.5 Arrangement of Exits.

18-2.5.1 Access to all required exits shall be in accordance with Section 5-5.

18-2.6 Travel Distance to Exits.

18-2.6.1 Travel distance from the door of a room in a suite or living unit to a corridor door shall not exceed the following limits:

(a) For buildings using Option 1 or 3 — 50 ft (15 m).

(b) For buildings using Option 2 or 4 — 100 ft (30 m).

18-2.6.2 The travel distance from a living unit entrance door to the nearest exit shall not exceed the following limits:

(a) For buildings using Option 1 — 100 ft (30 m).

(b) For buildings using Option 2, 3 or 4 — 150 ft (45 m).

18-2.6.3 Maximum single path corridor length of 35 ft (10.7 m) is permitted.

18-2.7 Discharge from Exits.

18-2.7.1 At least half of the required number of units of exit width from upper floors, exclusive of horizontal exits, shall lead directly to the street or through a yard, court, or passageway with protected openings and separated from all parts of the interior of the building.

18-2.7.2 A maximum of 50 percent of the exits may discharge through areas on the floor of exit discharge in accordance with 5-7.2.

18-2.8 Illumination of Means of Egress.

18-2.8.1 Every public space, hallway, stairway, and other means of egress shall have illumination in accordance with Section 5-8.

18-2.9 Emergency Lighting.

18-2.9.1 Any apartment building with more than 12 living units or greater than three stories in height shall have emergency lighting in accordance with Section 5-9.

Exception: Where every living unit has a direct exit to the outside at grade level.

18-2.10 Marking of Means of Egress.

18-2.10.1 Signs in accordance with Section 5-10 shall be provided in all apartment buildings requiring more than one exit.

18-2.11 Special Features.

18-2.11.1 Within any individual living unit, stairs more than one story above or below the entrance floor level of the living unit shall not be permitted.

18-2.11.2 In buildings using Option 1, 2, or 3, smokeproof enclosures shall be provided in accordance with 5-2.3 in buildings greater than six stories in height.

18-2.11.3* No door in any means of egress shall be locked against egress when the building is occupied.

18-2.11.4 Spiral stairs in accordance with 5-2.2.2.4 are permitted within a single living unit.

18-2.11.5 Winders in accordance with 5-2.2.2.5 are permitted within a single living unit.

SECTION 18-3 PROTECTION

18-3.1 Protection of Vertical Openings.

18-3.1.1 Every stairway, elevator shaft and other vertical opening shall be enclosed or protected in accordance with 6-2.2 and 5-1.3.1.

Exception No. 1: Stairway enclosures shall not be required where a one-story stair connects two levels within a single dwelling unit, guest room or suite.

Exception No. 2: An atrium may be utilized in accordance with 6-2.2.3.5.

Exception No. 3: In buildings using Option 4 — fire resistance of walls may be 1 hour. Fire protection rating of doors may be 1 hour.

Exception No. 4: There shall be no unprotected vertical opening in any building or fire section with only one exit.

18-3.1.2 In buildings of greater than six stories in height:

(a) Elevator shafts shall open into a smoke-resistant enclosure in accordance with Section 6-3, or

(b) The elevator shaft shall be provided with an approved smoke control system which will limit movement of smoke between floors.

Exception No. 1: Buildings protected throughout with a supervised automatic sprinkler system in accordance with Section 7-7.

Exception No. 2: Buildings in which all living units are served by exterior exit access in accordance with 5-5.3.

18-3.1.3* Any required exit stair which is so located 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 the lobby level, or to a mezzanine within the lobby. (*See 18-2.7.*)

18-3.1.4 No floor below the level of exit discharge, used only for storage, heating equipment, or other purposes other than residential occupancy open to the public, shall have unprotected openings to floors used for residential purposes.

18-3.2 Protection from Hazards.

18-3.2.1 In buildings using Option 1, 2, or 3, every hazardous area shall be separated from other parts of the building by construction having a fire resistance rating of at least 1 hour and communicating openings shall be protected by approved smoke-actuated automatic, or self-closing fire doors with a fire protection rating of ¾ hour, or such area shall be equipped with automatic extinguishing system. Hazardous areas include, but are not limited to:

Boiler and heater rooms	Rooms or spaces used for storage of combustible supplies and equipment in quantities deemed hazardous by the authority having jurisdiction.
Laundries	
Repair shops	

18-3.2.2 In buildings using Option 4, the enclosure for hazardous areas may be of any reasonably smoke-resisting construction with or without a fire resistance rating.

18-3.3 Interior Finish.

18-3.3.1 Interior finish on walls and ceilings, in accordance with Section 6-5, shall be as follows:

(a) In buildings using Option 1, 2 or 3

1. Vertical Exits — Class A
2. Exit Access — Class A or B
3. Lobbies, corridors that are not exit access — Class A or B
4. Individual apartments and other habitable spaces — Class A, B, or C.

(b) In buildings using Option 4

1. Vertical exits — Class A or Class B
2. Exit access — Class A, B or C
3. Lobbies, corridors that are not exit access — Class A, B or C
4. Individual apartments and other habitable spaces — Class A, B or C.

18-3.3.2 Interior Floor Finish. In buildings using Option 1 or 2, interior floor finish in corridors and exits shall be Class I or Class II in accordance with Section 6-5.

18-3.4 Detection, Alarm and Communications Systems.

18-3.4.1 General. Apartment buildings with more than three stories or with more than 11 living units shall be provided with a fire alarm system in accordance with Section 7-6.

18-3.4.2 Initiation.

18-3.4.2.1 Initiation of the required fire alarm system shall be by manual means in accordance with 7-6.2.

18-3.4.2.2 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 18-3.4.2.1.

18-3.4.2.3 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 18-3.4.2.1.

18-3.4.2.4 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 18-3.4.2.1.

18-3.4.3 Notification.

18-3.4.3.1 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: Buildings not greater than two stories in height and with not more than 50 living units.

18-3.4.3.2 Occupant notification shall be accomplished automatically without delay, by internal audible alarm signal in accordance with 7-6.3. Presignal systems are prohibited.

18-3.4.3.3 In buildings greater than six stories in height occupant notification also shall be provided by an approved means of voice communication.

Exception: Buildings using Option 2 or 4.

18-3.4.4 Detection.

18-3.4.4.1 Approved single station or multiple station smoke detectors continuously powered by house electrical service shall be installed in accordance with 7-6.2.7 in every living unit within the apartment building regardless of the number of stories or number of apartments. When activated, the detector shall initiate an alarm which is audible in the sleeping rooms of that unit. This individual unit detector shall be in addition to any sprinkler system or other detection system that may be installed in the building.

Exception: The single station smoke detector is not required when the building is equipped with a total automatic smoke detection system throughout.

18-3.4.4.2 In buildings using Option 2 a total automatic fire detection system is required. An automatic fire detection system is one which is designed to give complete coverage with fire detectors in accordance with the spacings and layouts given in NFPA 72E, *Standard on Automatic Fire Detectors*, and laboratory test data, and is one in which the detectors are tied together to initiate the alarm and other automatic fire protection devices.

18-3.5 Extinguishment Requirements.

18-3.5.1 In buildings using Option 3 automatic sprinklers shall be installed in corridors along the corridor ceiling, and one sprinkler head shall be opposite the center of and inside any living unit door opening onto the corridor.

18-3.5.2 The sprinkler installation required in 18-3.5.1 shall meet the requirements of Section 7-7 in terms of workmanship and materials.

18-3.5.3 The installation of the corridor sprinklers required by 18-3.5.1 shall meet the spacing and protection area requirements of Section 7-7.

18-3.5.4 Buildings using Option 4 shall be protected throughout by an approved automatic sprinkler system. The automatic sprinkler system shall meet the requirements of Section 7-7, including requirements for supervision.

Exception: Sprinkler installation may be omitted in small compartmented areas such as closets not over 24 sq ft (2.2 sq m) and bathrooms not over 55 sq ft (5.1 sq m).

18-3.5.5 Portable fire extinguishers shall be provided in hazardous areas. When provided, portable fire extinguishers shall be installed and maintained as specified 7-7.4.1.

18-3.6 Corridors.

18-3.6.1 Exit access corridors shall be protected as follows:

(a) In buildings using Option 1, corridor walls shall have a fire resistance rating of not less than 1 hour; doors from living units to corridors shall have a fire protection rating of not less than 20 minutes.

(b) In buildings using Option 2 or 3, corridor walls shall have a fire resistance rating of not less than ¾ hour; doors from living units to corridors shall have a fire protection rating of not less than 20 minutes.

(c) In buildings using Option 4, corridor walls shall have a fire resistance rating of not less than ½ hour; doors from living units to corridors shall have a fire protection rating of not less than 20 minutes.

18-3.6.2 Doors between apartments and corridors shall be self-closing.

18-3.6.3* The fire protection rating of doors from living units to corridors shall be not less than 20 minutes.

18-3.7 Subdivisions of Building Spaces.

18-3.7.1 Horizontal Exits. Sufficient horizontal exits are required to limit the maximum gross area per story between horizontal exits to that specified below:

(a) The gross area per story between horizontal exits shall not be limited for the purposes of this *Code* for buildings not greater than three stories in height.

(b) In buildings using Option 1 or 2, the gross area per story between horizontal exits shall be a maximum of 20,000 sq ft (1900 sq m) for buildings greater than three but not greater than six stories in height.

(c) The gross area per story between horizontal exits for buildings greater than six stories in height shall be a maximum of 10,000 sq ft (930 sq m) in buildings using Option 1; 15,000 sq ft (1400 sq m) in Option 2; and 20,000 sq ft (1900 sq m) in Option 3.

Exception: Where exterior exit access in accordance with 5-5.3 is provided.

18-3.7.2 Smoke Barriers. Smoke barriers in accordance with Section 6-3 shall be provided in exit access corridors to establish at least two compartments approximately equal in size. The maximum length of each smoke compartment measured along the corridor shall not exceed 200 ft (60 m). Smoke dampers are not required.

Exception No. 1: Buildings using Option 4.

Exception No. 2: Where exit access is through an atrium (see 6-2.2.3.5).

Exception No. 3: Exterior exit access in accordance with 5-5.3 which provides access to two exits.

Exception No. 4: Buildings allowed to comply with 18-2.4.1 Exceptions No. 1, 2, or 3.

Exception No. 5: Buildings with exits not more than 50 ft (15 m) apart.

Exception No. 6: Where each dwelling unit has direct access to the exterior at grade.

18-3.8 Special Features.

18-3.8.1 Interior exit access corridors in buildings greater than six stories in height using Option 1 or 2 shall be continuously pressurized at a minimum of 0.01 in. (2.5 Pa) water, measured at any living unit door.

SECTION 18-4 SPECIAL PROVISIONS

18-4.1 Operating Features. (*See Chapter 31.*)

SECTION 18-5 BUILDING SERVICES

18-5.1 Utilities. Utilities shall comply with the provisions of Section 7-1.

18-5.2 Heating, Ventilating, and Air Conditioning. Heating, ventilating, and air conditioning equipment shall comply with the provisions of Section 7-2.

18-5.3 Elevators, Dumbwaiters, and Vertical Conveyors. Elevators, dumbwaiters, and vertical conveyors shall comply with the provisions of Section 7-4.

18-5.4 Rubbish Chutes, Incinerators, and Laundry Chutes. Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 7-5.

Table 18-1
Alternate Requirements for New Apartment Buildings According to Protection Provided

	No Suppression or Detection System Option No. 1	Total Automatic Detection Option No. 2	Sprink. Prot. in Select. Areas Option No. 3	Auto Ext. NFPA 13 (with exceptions) Option No. 4
Max. Gross Area per Story Between Horizontal Exits				
1-3 Stories	NR	NR	NR	NR
4-6 Stories	20,000 sq ft (1,900 sq m)	20,000 sq ft (1,900 sq m)	NR	NR
>6 Stories	10,000 sq ft (930 sq m)	15,000 sq ft (1,400 sq m)	20,000 sq ft (1,900 sq m)	NR
Exit Access				
Travel Distance	100 ft (30 m)	150 ft (45 m)	150 ft (45 m)	150 ft (45 m)
Smoke Barrier Req. (*See 18-3.7.2.*)	Req.	Req.	Req.	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	35 ft (10.7 m)	35 ft (10.7 m)	35 ft (10.7 m)	35 ft (10.7 m)
Fire Resistance				
Walls	1 hr	¾ hr	¾ hr	½ hr
Doors (Fire Protection Rating)	20 min	20 min	20 min	20 min
Flame-Spread				
Walls & Ceilings	A or B	A or B	A or B	A, B, or C
Floors	I or II	I or II	NR	NR
Exits—Vertical				
Fire Resistance Walls				
1-3 Stories	1 hr	1 hr	1 hr	1 hr
>3 Stories	2 hr	2 hr	2 hr	1 hr
Smokeproof Enclosures				
1-6 Stories	NR	NR	NR	NR
>6 Stories	Req.	Req.	Req.	NR
Doors				
1-3 Stories	1 hr	1 hr	1 hr	1 hr
>3 Stories	1½ hr	1½ hr	1½ hr	1 hr
Flame Spread				
Walls & Ceilings	A	A	A	A or B
Floors	I or II	I or II	NR	NR
Exits—Horizontal				
Fire Resistance				
Walls	2 hr	2 hr	2 hr	NA
Doors	1½ hr	1½ hr	1½ hr	NA
Habitable Spaces				
Max. Distance from any Room Door to Corridor	50 ft (15 m)	100 ft (30 m)	50 ft (15 m)	100 ft (30 m)
Flamespread Walls & Ceilings	A, B, or C	A, B, or C	A, B, or C	A, B, or C
Smoke Detector in Unit	Req.	Req.	Req.	Req.
Door to Corridor Self-Closing	Req.	Req.	Req.	Req.
Bedroom Windows, per Section 22-2. (*See 18-1.1.2.*)	Req.	Req.	Req.	NR
Alarm System				
>3 Stories or >11 Units >2 Stories or >50 Units >6 Stories	manual annunciator panel voice communication	manual & auto annunciator panel	manual & auto annunciator panel voice communication	manual & auto annunciator panel
HVAC				
>6 Stories Pressurized Corridor, 0.01 in. Water (2.5 Pa), min.	Req.	Req.	NR	NR
Elevator				
ANSI	A17.1	A17.1	A17.1	A17.1
Vestibule Protection (*See 18-3.1.2.*)	Req.	Req.	Req.	NR

Req.=Required. See *Code* for details and Exceptions
NL=No Limit.
NR=No Requirements.
NA=Not Applicable

CHAPTER 19 EXISTING APARTMENT BUILDINGS

(See also Chapter 31.)

SECTION 19-1 GENERAL REQUIREMENTS

19-1.1 Application.

19-1.1.1 All existing buildings classified as apartment buildings by 19-1.3 shall conform to the provisions of this chapter, and shall meet the requirements of one of the following options:

Option 1: Buildings without fire suppression or detection systems;

Option 2: Buildings provided with a complete automatic fire detection and notification system;

Option 3: Buildings provided with automatic sprinkler protection in selected areas;

Option 4: Buildings protected throughout by an approved automatic sprinkler system.

19-1.1.2 Every individual living unit covered by this chapter shall at least comply with the minimum provisions of Section 22-2 for one- and two-family dwellings.

19-1.2 Mixed Occupancies.

19-1.2.1 Where another type of occupancy occurs in the same building as a residential occupancy, the requirements of 1-4.7 of this *Code* shall be applicable.

19-1.2.2 For requirements on mixed mercantile and residential occupancies, see 25-1.2.

19-1.3 Definitions.

19-1.3.1 Terms applicable to this chapter are defined in Chapter 3 of this *Code*; where necessary, other terms will be defined in the text as they may occur.

Apartment Buildings. Includes buildings containing three or more living units with independent cooking and bathroom facilities, whether designated as apartment house, tenement, garden apartment, or by any other name.

Mezzanine. An intermediate level between the floor and ceiling of any story and covering not more than one-third of the floor area of the room in which it is located.

19-1.4 Classification of Occupancy. *(See 19-1.3.1.)*

19-1.5 Classification of Hazard of Contents.

19-1.5.1* Building contents shall be classified according to the provisions of 4-2.1 of this *Code*. For design of sprinkler systems, the classification of contents in NFPA 13, *Standard for the Installation of Sprinkler Systems*, shall apply.

19-1.6 Minimum Construction Requirements. No Special Requirements.

19-1.7 Occupant Load.

19-1.7.1* The occupant load in numbers of persons for whom exits are to be provided shall be determined on the basis of one person per 200 sq ft (18.6 sq m) gross floor area, or the maximum probable population of any room or section under consideration, whichever is greater. The occupant load of any open mezzanine or balcony shall be added to the occupant load of the floor below for the purpose of determining exit capacity.

SECTION 19-2 MEANS OF EGRESS REQUIREMENTS

19-2.1 General.

19-2.2 Types of Exits.

19-2.2.1 Exits, or exit components, arranged in accordance with Chapter 5, shall be of one or more of the following types:

(a) Doors, as per 5-2.1.

(b) Revolving doors, in accordance with 5-2.1.10.

(c) Doors to subways, only if the subway meets the requirements of exit passageways as specified in 5-2.6.

(d) Stairs, Class A or Class B, in accordance with 5-2.2.

(e) Smokeproof enclosures, in accordance with 5-2.3.

(f) Horizontal exits, in accordance with 5-2.4.

(g) Ramps, Class A or Class B, in accordance with 5-2.5.

(h) Exit passageways, in accordance with 5-2.6.

(i) Fire escape stairs, in accordance with 5-2.8.

19-2.2.2* Escalators previously approved as a component in the means of egress may continue to be given credit.

19-2.3 Capacity of Means of Egress.

19-2.3.1 The capacity of means of egress shall be in accordance with Section 5-3.

19-2.3.2* Street-floor exits shall provide units of exit width as follows, occupant load being determined in accordance with 19-1.7.

(a) One unit for each 100 persons street-floor capacity for doors and other level exits, including those 24 in. (61 cm) or three risers above or below ground level.

(b) One unit for each 75 persons street-floor capacity for stair or other exit requiring descent to ground level.

(c) One and one-half exit units for each two-unit required stair from upper floors discharging through the street-floor.

(d) One and one-half exit units for each two-unit required stair from floors below the street-floor discharging through the street-floor.

19-2.3.3 Every floor below the level of exit discharge shall have exits sufficient to provide for the occupant load of that floor as determined in accordance with 19-1.7 on the basis of 100 persons per exit unit for travel on the same level, 75 persons for upward travel, as up stairs.

19-2.3.4 Upper-floor exits shall provide numbers of units of exit width sufficient to meet the requirements of 19-2.3.1.

19-2.4 Number of Exits.

19-2.4.1 Every living unit shall have access to at least two separate exits remote from each other as required by 5-5.1.

Exception No. 1: Any living unit which has an exit directly to the street or yard at ground level or by way of an outside stairway, or an enclosed stairway with fire resistance rating of 1 hour or more serving that apartment only and not communicating with any floor below the level of exit discharge or other area not a part of the apartment served, may have a single exit.

Exception No. 2: A building of any height with not more than four living units per floor with a smokeproof enclosure or outside stair in accordance with the requirements of 5-2.3 as the exit, immediately accessible to all living units served thereby, may have a single exit. ["Immediately accessible" means there is not more than 20 ft (6.1 m) of travel distance to reach an exit from the entrance door of any living unit.]

Exception No. 3: Any building three stories or less in height, with ¾-hour horizontal and vertical separation between living units, may have a single exit, under the following conditions:

(a) The stairway is completely enclosed by barriers having a fire resistance rating of at least 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 story below the level of exit discharge.

(c) All corridors serving as access to exits have at least a 1-hour fire resistance rating.

(d) There is not more than 35 ft (10.7 m) of travel distance to reach an exit from the entrance door of any living unit.

19-2.5 Arrangement of Exits.

19-2.5.1 Access to all required exits shall be in accordance with Section 5-5.

19-2.6 Travel Distance to Exits.

19-2.6.1 Travel distance from the door of a room in a suite or living unit to a corridor door shall not exceed the following limits:

(a) For buildings using Option 1 or 3 — 50 ft (15 m).

(b) For buildings using Option 2 or 4 — 100 ft (30 m).

19-2.6.2 The travel distance from a living unit entrance door to the nearest exit shall not exceed the following limits:

(a) For buildings using Option 1 — 100 ft (30 m).

(b) For buildings using Option 2, 3 or 4 — 150 ft (45 m).

19-2.6.3 Maximum single path corridor length of 35 ft (10.7 m) permitted.

19-2.7 Discharge from Exits.

19-2.7.1 At least half of the required number of units of exit width from upper floors, exclusive of horizontal exits, shall lead directly to the street or through a yard, court, or passageway with protected openings and separated from all parts of the interior of the building.

19-2.7.2 If any exits discharge through areas on the level of exit discharge, the conditions of 5-7.2 shall be met.

19-2.8 Illumination of Means of Egress.

19-2.8.1 Every public space, hallway, stairway, and other means of egress shall have illumination in accordance with Section 5-8.

19-2.9 Emergency Lighting.

19-2.9.1 Any apartment building with more than 12 living units or greater than three stories in height shall have emergency lighting in accordance with Section 5-9.

Exception: Where every living unit has a direct exit to the outside at grade level.

19-2.10 Marking of Means of Egress.

19-2.10.1 Exit signs in accordance with Section 5-10 shall be provided in all apartment buildings requiring more than one exit.

19-2.11 Special Features.

19-2.11.1 Within any individual living unit, stairs more than one story above or below the entrance floor level of the living unit shall not be permitted.

19-2.11.2* In buildings using Option 1, 2 or 3, smokeproof enclosures shall be provided in accordance with 5-2.3 in buildings greater than six stories in height.

19-2.11.3* No door in any means of egress shall be locked against egress when the building is occupied.

19-2.11.4 Spiral stairs in accordance with 5-2.2.2.4 are permitted within a single living unit.

19-2.11.5 Winders in accordance with 5-2.2.2.5 are permitted.

SECTION 19-3 PROTECTION

19-3.1 Protection of Vertical Openings.

19-3.1.1 Every stairway, elevator shaft and other vertical opening shall be enclosed or protected in accordance with 6-2.2 and 5-1.3.1 or provide means of satisfying the requirements of Section 2-9.

Exception No. 1: Stairway enclosures shall not be required where a one-story stair connects two levels within a single dwelling unit, guest room or suite.

Exception No. 2: An atrium may be utilized in accordance with 6-2.2.3.5.

Exception No. 3: In buildings using Option 4 fire resistance of exit enclosures — fire resistance of walls may be ¾ hour for buildings of one to three stories, and 1 hour for buildings greater than three stories — fire protection rating of doors may be ¾ hour for buildings up to three stories and 1 hour for buildings greater than three stories.

Exception No. 4: Unprotected vertical openings connecting not more than three floors may be permitted in accordance with the conditions of 6-2.2.3.4.

Exception No. 5: In any building provided with a complete automatic sprinkler system in accordance with Section 7-7, and where 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 not part of required exits may be waived by the authority having jurisdiction to such extent as such openings do not endanger required means of egress.

19-3.1.2 Any required exit stair which is so located 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 the lobby level, or to a mezzanine within the lobby. (*See 19-2.7.*)

19-3.1.3 No floor below the level of exit discharge used only for storage, heating equipment, or other purpose other than residential occupancy open to the public shall have unprotected openings to floors used for residential purposes.

19-3.2 Protection from Hazards.

19-3.2.1 In buildings using Option 1, 2, or 3, every hazardous area shall be separated from other parts of the building by construction having a fire resistance rating of at least 1 hour and communicating openings shall be protected by approved smoke-actuated automatic, or self-closing fire doors with a fire protection rating of ¾ hour, or such area shall be equipped with automatic extinguishing system. Hazardous areas include, but are not limited to:

Boiler and heater rooms Laundries Repair shops	Rooms or spaces used for storage of combustible supplies and equipment in quantities deemed hazardous by the authority having jurisdiction.

19-3.2.2 In buildings using Option 4, the enclosure for hazardous areas may be of any reasonably smoke-resisting construction with or without a fire resistance rating.

19-3.3 Interior Finish.

19-3.3.1 Interior finish on walls and ceilings, in accordance with Section 6-5, shall be as follows:

(a) In buildings using Option 1, 2 or 3

1. Vertical exits — Class A or B
2. Exit access — Class A or B
3. Lobbies, corridors that are not exit access — Class A or B
4. Individual living units and other habitable spaces — Class A, B, or C

(b) In buildings using Option 4

1. Vertical exits — Class A, B, or C
2. Exit access — Class A, B or C
3. Lobbies, corridors that are not exit access — Class A, B or C
4. Individual living units and other habitable spaces — Class A, B or C

19-3.3.2 Interior Floor Finish. In buildings using Option 1 or 2, interior floor finish in corridors and exits shall be Class I or Class II in accordance with Section 6-5.

Exception: Previously installed floor coverings may be continued in use, subject to the approval of the authority having jurisdiction.

19-3.4 Detection, Alarm and Communication Systems.

19-3.4.1 General. Apartment buildings with more than three stories or with more than 11 living units shall be provided with a fire alarm system in accordance with Section 7-6.

19-3.4.2 Initiation.

19-3.4.2.1 Initiation of the required fire alarm system shall be by manual means in accordance with 7-6.2.

19-3.4.2.2 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 19-3.4.2.1.

19-3.4.2.3 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 19-3.4.2.1.

19-3.4.2.4 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 19-3.4.2.1.

19-3.4.3 Notification.

19-3.4.3.1 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: Buildings not greater than two stories in height and with not more than 50 living units.

19-3.4.3.2 Occupant notification shall be by internal audible alarm signal in accordance with 7-6.3.

19-3.4.4 Detection.

19-3.4.4.1 Approved single station or multiple station smoke detectors, continuously powered by the house electrical service, shall be installed in accordance with 7-6.2.7 in every living unit within the apartment building regardless of the number of stories or number of apartments. When activated, the detector shall initiate an alarm which is audible in the sleeping rooms of that unit. This individual unit detector shall be in addition to any sprinkler system or other detection system that may be installed in the building.

Exception: The single station smoke detector is not required when the building is equipped with a total automatic smoke detection system throughout.

19-3.4.4.2 In buildings using Option 2 a total automatic fire detection system is required. An automatic fire detection system is one which is designed to give complete coverage with fire detectors in accordance with the spacings and layouts given in NFPA 72E, *Standard on Automatic Fire Detectors*, and laboratory test data, and is one in which the detectors are tied together to initiate the alarm and other automatic fire protection devices.

19-3.5 Extinguishment Requirements.

19-3.5.1 In buildings using Option 3, automatic sprinklers shall be installed in corridors along the corridor ceiling, and one sprinkler head shall be opposite the center of and inside any living unit door opening into the corridor.

Exception: The sprinkler head inside living units may be omitted if the door to the living unit has a fire protection rating of at least 20 minutes and is self-closing.

19-3.5.2 The sprinkler installation required in 19-3.5.1 shall meet the requirements of Section 7-7 in terms of workmanship and materials.

19-3.5.3 The installation of the corridor sprinklers required in 19-3.5.1 shall not exceed the maximum spacing and protection area requirements of Section 7-7.

19-3.5.4 Buildings using Option 4 shall be protected throughout by an approved automatic sprinkler system. The automatic sprinkler system shall meet the requirements of Section 7-7 and the requirements for supervision for buildings greater than six stories in height.

Exception: Sprinkler installation may be omitted in small compartmented areas such as closets not over 24 sq ft (2.2 sq m) and bathrooms not over 55 sq ft (5.1 sq m).

19-3.5.5 Portable fire extinguishers shall be provided in hazardous areas. When provided, portable fire extinguishers shall be installed and maintained as specified in 7-7.4.1.

19-3.6 Corridors.

19-3.6.1 Exit access corridors shall be protected as follows:

(a) In buildings using Option 1 or 2, corridor walls shall have a fire resistance rating of not less than 30 minutes; doors from living units to corridors shall have a fire protection rating of not less than 20 minutes or shall be previously approved 1¾-in. (4.4-cm) solid bonded wood core doors.

(b) In buildings using Option 3, corridor walls shall have a fire resistance rating of not less than ¾ hour; doors and frames shall be constructed to resist passage of smoke. Doors shall be equipped with latches for keeping doors tightly closed.

(c) In buildings using Option 4, corridor walls shall have a fire resistance rating of not less than ½ hour; doors and frames shall be constructed to resist the passage of smoke. Doors shall be equipped with latches for keeping doors tightly closed.

19-3.6.2 Doors between living units and corridors shall be self-closing. Doors shall be equipped with latches for keeping doors tightly closed.

19-3.6.3* The fire protection rating of doors from living units to corridors shall be not less than 20 minutes.

Exception No. 1: Previously approved 1¾-in. (4.4-cm) solid bonded wood core doors may continue in use.

Exception No. 2: In buildings using Option 3 or 4, doors shall be so constructed as to resist the passage of smoke.

19-3.6.4 Transfer grilles, whether protected by fusible link operated dampers or not, shall not be permitted in these walls or doors.

19-3.7 Subdivision of Building Spaces.

19-3.7.1 Smoke Barriers. Smoke barriers in accordance with Section 6-3 shall be provided in exit access corridors to establish at least two compartments approximately equal in size. The maximum length of each smoke compartment measured along the corridor shall not exceed 200 ft (60 m). Smoke dampers are not required.

Exception No. 1: Buildings using Option 4.

Exception No. 2: Where exit access is through an atrium (see 6-2.2.3.5).

Exception No. 3: Exterior exit access in accordance with 5-5.3 which provides access to two exits.

Exception No. 4: Buildings allowed to comply with 19-2.4.1 Exceptions No. 1, 2, or 3.

Exception No. 5: Buildings with exits not more than 50 ft (15 m) apart.

Exception No. 6: Where each dwelling unit has direct access to the exterior at grade.

SECTION 19-4 SPECIAL PROVISIONS

19-4.1 Operating Features. (*See Chapter 31.*)

SECTION 19-5 BUILDING SERVICES

19-5.1 Utilities. Utilities shall comply with the provisions of Section 7-1.

19-5.2 Heating, Ventilating, and Air Conditioning. Heating, ventilating and air conditioning equipment shall comply with the provisions of Section 7-2.

19-5.3 Elevators, Dumbwaiters and Vertical Conveyors. Elevators, dumbwaiters and vertical conveyors shall comply with the provisions of Section 7-4.

19-5.4 Rubbish Chutes, Incinerators, and Laundry Chutes. Rubbish chutes, incinerators and laundry chutes shall comply with the provisions of Section 7-5.

Table 19-1
Alternate Requirements for Existing Apartment Buildings According to Protection Provided

	No Suppression or Detection System Option No. 1	Total Automatic Detection Option No. 2	Sprink. Prot. in Select. Areas Option No. 3	Auto Ext. NFPA 13 (with exceptions) Option No. 4
Max. Gross Area per Story Between Horizontal Exits				
1-3 Stories	NR	NR	NR	NR
4-6 Stories	NR	NR	NR	NR
>6 Stories	NR	NR	NR	NR
Exit Access				
Travel Distance	100 ft (30 m)	150 ft (45 m)	150 ft (45 m)	150 ft (45 m)
Smoke Barrier Req. (*See 19-3.7.1.*)	Req.	Req.	Req.	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	35 ft (10.7 m)	35 ft (10.7 m)	35 ft (10.7 m)	35 ft (10.7 m)
Fire Resistance				
Walls	½ hr	½ hr	¾ hr	½ hr
Doors (Fire Protection Rating)	20 min	20 min	N/A	N/A
Flame Spread				
Walls & Ceilings	A or B	A or B	A or B	A, B, or C
Floors	I or II	I or II	NR	NR
Exits—Vertical				
Fire Resistance Walls				
1-3 Stories	1 hr	1 hr	1 hr	¾ hr
>3 Stories	2 hr	2 hr	2 hr	1 hr
Smokeproof Enclosures				
1-6 Stories	NR	NR	NR	NR
>6 Stories	Req.	Req.	Req.	NR
Doors				
1-3 Stories	1 hr	1 hr	1 hr	¾ hr
>3 Stories	1½ hr	1½ hr	1½ hr	1 hr
Flame Spread				
Walls & Ceilings	A or B	A or B	A or B	A, B, or C
Floors	I or II	I or II	NR	NR
Exits—Horizontal				
Fire Resistance				
Walls	2 hr	2 hr	2 hr	NA
Doors	1½ hr	1½ hr	1½ hr	NA
Habitable Spaces				
Max. Distance from any Room Door to Corridor	50 ft (15 m)	100 ft (30 m)	50 ft (15 m)	100 ft (30 m)
Flame Spread Walls & Ceilings	A, B, or C	A, B, or C	A, B, or C	A, B, or C
Smoke Detector in Unit	Req.	Req.	Req.	Req.
Door to Corridor Self-Closing	Req.	Req.	Req.	Req.
Bedroom Windows, per Section 22-2. (*See 19-1.1.2.*)	Req.	Req.	Req.	NR
Alarm System				
>3 Stories or >11 Units	manual annunciator panel	manual & auto annunciator panel	manual & auto annunciator panel	manual & auto annunciator panel
>2 Stories or >50 Units				
HVAC				
>6 Stories Pressurized Corridor, 0.01 in. Water (2.5 Pa), min.	NR	NR	NR	NR
Elevator				
ANSI	A17.1	A17.1	A17.1	A17.1
Vestibule Protection	NR	NR	NR	NR

Req.=Required See *Code* for details and Exceptions
NL=No Limit
NR=No Requirements
NA=Not Applicable.

CHAPTER 20 LODGING OR ROOMING HOUSES

SECTION 20-1 GENERAL REQUIREMENTS

20-1.1 Application.

20-1.1.1 This chapter applies only to lodging or rooming houses providing sleeping accommodations for 16 or fewer persons. Lodging or rooming houses include buildings in which separate sleeping rooms are rented providing 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 22.

20-1.1.2 The requirements of this chapter are applicable to new buildings, and to existing or modified buildings according to the provisions of Section 1-4 of this *Code*.

20-1.2 Mixed Occupancies.

20-1.2.1 Where another type of occupancy occurs in the same building as a residential occupancy, the requirements of 1-4.7 of this *Code* shall be applicable.

20-1.2.2 For requirements on mixed mercantile and residential occupancies, see 24-1.2 or 25-1.2.

20-1.3 Definitions.

20-1.3.1 Terms applicable to this chapter are defined in Chapter 3 of this *Code*; where necessary, other terms will be defined in the text as they may occur.

20-1.4 Classification of Occupancy. (*See 20-1.1.1.*)

20-1.5 Classification of Hazard of Contents.

20-1.5.1* Building contents shall be classified according to the provisions of 4-2.1 of this *Code*. For design of sprinkler systems, the classification of contents in NFPA 13, *Standard for the Installation of Sprinkler Systems*, shall apply.

20-1.6 Minimum Construction Requirements. No Special Requirements.

20-1.7 Occupant Load. (*See 20-1.1.1.*)

SECTION 20-2 MEANS OF ESCAPE

20-2.1 Number and Means of Escape.

20-2.1.1 Every sleeping room shall have access to a primary means of escape so located as to provide a safe path of travel to the outside of the building without traversing any corridor or space exposed to an unprotected vertical opening. Where the sleeping room is above or below the level of exit discharge, the primary means shall be an enclosed interior stair, an exterior stair, a horizontal exit, or an existing fire escape stair.

20-2.1.2 In addition to the primary route each sleeping room shall have a second means of escape in accordance with 22-2.1.2.

Exception: If the bedroom has a door leading directly outside of the building with access to grade or to a stairway that meets the requirements for exterior stairs in 20-2.1.1, that exit shall be considered as meeting all of the exit requirements for that sleeping room.

20-2.2 Interior stairways shall be enclosed with 20-minute fire barriers with all openings protected with smoke-actuated automatic or self-closing doors having a fire resistance comparable to that required for the enclosure. The stairway shall comply with 5-2.2.3.4.

Exception No. 1: Stairs connecting two levels only may be open to other than the street floor.

Exception No. 2: Stairways may be unprotected in accordance with the Exception to 20-3.1.1.

20-2.3 No door or path of travel to a means of egress shall be less than 28 in. (71 cm) wide.

Exception: Bathroom doors may be 24 in. (61 cm) wide.

20-2.4 Every closet door latch shall be such that it can be readily opened from the inside in case of emergency.

20-2.5 Every bathroom door shall be designed to permit the opening of the locked door from the outside in an emergency.

20-2.6 Winders in accordance with 5-2.2.2.5 are permitted.

20-2.7* No door in any means of egress shall be locked against egress when the building is occupied.

SECTION 20-3 PROTECTION

20-3.1 Protection of Vertical Openings.

20-3.1.1 Vertical openings shall be protected so that no primary exit route is exposed to an unprotected vertical opening. The vertical opening is 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 20 minutes. Any doors or openings shall have equivalent fire and smoke resisting capability to the enclosure and be automatic-closing on detection of smoke or be self-closing.

Exception: In buildings three stories or less in height, protected throughout by an approved automatic sprinkler system in accordance with Section 7-7, unprotected vertical openings are permitted. However, in such case, there shall still remain a primary means of exit from each sleeping area that does not require occupants to pass through a portion of a lower floor, unless that route is separated from all spaces on that floor by construction having a 20-minute fire resistance rating.

20-3.1.2 Exterior stairs shall be reasonably protected against blockage by a fire that would simultaneously expose both the interior and exterior means of escape. This may be accomplished by physical separation distance, arrangement of the stairs, protection of the openings exposing the stairs, or other means acceptable to the authority having jurisdiction.

20-3.2 Interior Finish. Interior finish on walls and ceilings of occupied spaces shall be Class A, B, or C as defined in Section 6-5. There are no requirements for interior floor finish.

20-3.3 Detection, Alarm and Communications Systems.

20-3.3.1 General. Lodging and rooming houses shall be

provided with a fire alarm system in accordance with Section 7-6.

Exception No. 1: Buildings which have a smoke detection system meeting or exceeding the requirements of 20-3.3.4 and have that detection system include at least one manual fire alarm station per floor arranged to initiate the smoke detection alarm.

Exception No. 2: Buildings protected throughout by an approved automatic sprinkler system in accordance with Section 7-6.

20-3.3.2 Initiation. Initiation of the required fire alarm system shall be by manual means in accordance with 7-6.2.

20-3.3.3 Notification. Occupant notification shall be provided automatically, without delay, by internal audible alarm in accordance with 7-6.2.7. Presignal systems are prohibited.

20-3.3.4 Detection. Approved smoke detectors meeting the requirements of 7-6.2.7 shall be provided.

Exception: Existing battery powered detectors, rather than house electric service powered detectors, shall be accepted when, in the opinion of the authority having jurisdiction, the facility has demonstrated testing, maintenance, and battery replacement programs that ensure power reliability to the detectors.

20-3.4 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 or other air passages penetrating the wall except properly installed heating and utility installations other than transfer grilles. Transfer grilles are prohibited. Doors shall be provided with latches or other mechanisms suitable for keeping the doors closed. No doors shall be arranged so as to prevent the occupant from closing the door. Doors shall be self-closing or automatic-closing upon detection of smoke.

Exception: Door closing devices are not required in buildings protected throughout by an approved automatic sprinkler system in accordance with Section 7-7.

SECTION 20-4 SPECIAL PROVISIONS

20-4.1 Operating Features. (*See Chapter 31.*)

SECTION 20-5 BUILDING SERVICES

CHAPTER 21 RESIDENTIAL BOARD AND CARE OCCUPANCIES

SECTION 21-1 GENERAL REQUIREMENTS

21-1.1 Application.

21-1.1.1* All facilities classified as residential board and care occupancies shall conform to the requirements of this chapter. This chapter is divided into four sections as follows:

(a) Section 21-1 — General Requirements.

(b) Section 21-2 — Small Facilities (i.e., Sleeping accommodations for not more than 16 residents).

(c) Section 21-3 — Large Facilities (i.e., Sleeping accommodations for more than 16 residents).

(d) Section 21-4 — Suitability of an Apartment Building to House a Board and Care Occupancy.

21-1.2 Mixed Occupancies.

21-1.2.1 Where another type of occupancy occurs in the same building as a residential board and care occupancy, the requirements of 1-4.7 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 exit system by construction having a fire resistance rating of at least 2 hours.

Exception No. 2: Apartment buildings housing residential board and care occupancies in conformance with Section 21-4. In such facilities any safeguards required by Section 21-4 that are more restrictive than those for other housed occupancies apply only to the extent prescribed by Section 21-4.

21-1.3 Definitions.

Residential Board and Care Occupancy.* A building or part thereof that is used for the lodging and boarding of four or more residents, not related by blood or marriage to the owners or operators, to provide personal care services.

Personal Care. "Personal care" means protective care of a resident who does not require chronic or convalescent medical or nursing care. Personal care involves responsibility for the safety of the resident when in the building. Protective care may include a daily awareness by the management of the resident's functioning, his or her whereabouts, the making and reminding a resident of appointments, the ability and readiness to intervene if a crisis arises for a resident, supervision in areas of nutrition and medication, and actual provision of transient medical care.

Evacuation Capability.* Evacuation capability is the ability of the occupants, residents and staff as a group to either evacuate the building or relocate from the point of occupancy to a point of safety. Following are the levels of evacuation capability covered by this chapter:

(a) *Prompt.* Evacuation capability equivalent to the capability of the general population when applying the requirements for residential occupancies covered by Chapters 16, 17, 18, 19, 20 and 22.

(b) *Slow.* Evacuation capability of the group to move to a point of safety in a timely manner, with some of the residents requiring assistance from the staff.

(c) *Impractical.* A group, even with staff assistance, that cannot reliably move to a point of safety in a timely manner.

Hazardous Area. A hazardous area is any space that contains storage or other activity having fuel conditions exceeding that of a one- or two-family dwelling and possessing the potential for a fully involved fire. Hazardous areas include, but are not limited to, areas for cartoned storage, food or household maintenance items in wholesale or institutional-type quantities and concentrations, or massed storage of residents' belongings. Areas containing approved, properly installed and maintained furnaces and heating equipment, and furnace rooms, cooking, and laundry facilities are not classed as hazardous areas on the basis of such equipment.

Point of Safety. A point of safety is a location that meets one of the following:

(a) Is exterior to and away from the building.

(b) Is within a building of any construction protected throughout by an approved automatic sprinkler system and is either:

1. Within an exit enclosure meeting the requirements of this *Code*, or

2. Within another portion of the building which is separated by smoke barriers in accordance with Section 6-3 of at least a 20-minute fire resistance rating and that portion of the building has access to a means of escape or exit conforming to the requirements of this *Code* which does not require return to the area of fire involvement.

(c) Is within a building of Type I, Type II (222) or (111), Type III (211), Type IV, or Type V (111) construction and is either:

1. Within an exit enclosure meeting the requirements of this *Code*, or

2. Within another portion of the building which is separated by smoke barriers in accordance with Section 6-3 of at least a 20-minute fire resistance rating and that portion of the building has access to a means of escape or exit conforming to the requirements of this *Code* which does not require return to the area of fire involvement.

Resident. A person who is receiving personal care and resides in a residential board and care facility.

Staff. A person who provides personal care services, supervision, or assistance to residents.

21-1.4 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 31-7.3.

SECTION 21-2 SMALL FACILITIES

21-2.1 General.

21-2.1.1 Scope. This section 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 will be classed as a large facility. The requirements for large facilities are in Section 21-3.

21-2.1.2 The requirements of this section are applicable to new construction and existing buildings according to the provisions of Section 1-4 of this *Code*.

21-2.2 Requirements Based on Evacuation Capability.

21-2.2.1 Small facilities shall comply with the requirements of 21-2.2 as indicated for the appropriate evacuation capability.

Exception: Small residential board and care occupancies found to have equivalent safety. One method for determining this equivalency is given in Appendix G.*

21-2.2.2 Prompt Evacuation Capability.

21-2.2.2.1 Facilities housing groups capable of prompt evacuation shall meet the requirements of Chapter 20, Lodging or Rooming Houses, and the additional requirements of 21-2.2.2.2 through 21-2.2.2.5.

Exception: Facilities complying with 21-3.2.2.

21-2.2.2.2 Hazardous Areas. Any hazardous area shall be protected in accordance with the following:

(a) If a hazardous area is on the same floor as, and is in or abuts, a primary means of escape or a sleeping room, the hazardous area shall be protected by either:

1. An enclosure with a fire resistance rating of at least 1 hour with a self-closing or smoke-operated automatic-closing fire door having a fire protection rating of at least ¾ hour, or

2. Automatic sprinkler protection, in accordance with 21-2.2.2.5, of the hazardous area and a separation that will resist the passage of smoke between the hazardous area and the exposed sleeping area or primary exit route. Any doors in such separation shall be self-closing or automatic-closing on smoke detection.

(b) Other hazardous areas shall be protected by either:

1. An enclosure with a fire resistance rating of at least 20 minutes with a self-closing or smoke detector-operated automatic-closing door at least equivalent to a 1¾-in. (4.4-cm) solid bonded wood core construction, or

2. Automatic sprinkler protection, in accordance with 21-2.2.2.5, of the hazardous area regardless of enclosure.

21-2.2.2.3 Fire Alarm Systems. A manual fire alarm system shall be provided in accordance with Section 7-6.

Exception No. 1: If there is a smoke detection system meeting the requirements of 21-2.2.2.4 and that detection system includes at least one manual fire alarm station per floor arranged to continuously sound the smoke detection system alarm.

Exception No. 2: Other manually activated continuously sounding alarms acceptable to the authority having jurisdiction.

21-2.2.2.4 Smoke Detection System. Approved smoke detectors shall be installed in accordance with 7-6.2.7. These shall be powered by the house electrical service and, when activated, shall initiate an alarm which is audible in all sleeping areas. Detectors shall be installed on all levels, including basements, but excluding crawl spaces and unfinished attics. Additional detectors shall be installed for living rooms and day rooms.

21-2.2.2.5 Automatic Extinguishing Systems. Where an automatic sprinkler system is installed, either for total or partial building coverage, the system shall be in accordance with Section 7-7 and shall activate the fire alarm system in accordance with Section 7-6.

Exception No. 1: NFPA 13D, Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Mobile Homes, may be used in buildings where the characteristics of the occupancy are comparable with residential fire potentials.

Exception No. 2: Automatic sprinklers may be omitted in small compartmented areas such as closets not over 24 sq ft (2.2 sq m) and bathrooms not over 55 sq ft (5.1 sq m) provided such spaces are finished with lath and plaster, gypsum board, or materials of equivalent fire resistance.

21-2.2.3 Slow Evacuation Capability.

21-2.2.3.1 Facilities housing groups capable of slow evacuation shall meet the requirements for facilities housing groups capable of prompt evacuation (*see 21-2.2.2*) and the additional requirements of 21-2.2.3.2 through 21-2.2.3.6.

Exception: Facilities complying with 21-3.2.2.

21-2.2.3.2 Minimum Construction Requirements. The facility shall be housed in a building where the interior is fully sheathed with lath and plaster, gypsum board, or equivalent protection, including all portions of the bearing walls, bearing partitions, floor constructions, and roofs. All columns, beams, girders and trusses are similarly encased, or otherwise treated to provide a minimum of at least a 20-minute fire resistance rating.

Exception No. 1: Buildings with the only exposed steel or wood serving as columns and support beams (but not joists) located in the basement area are considered as fully sheathed.

Exception No. 2: Buildings of Type I, Type II (111), Type III (211), Type IV, or Type V (111) construction.

Exception No. 3: Buildings where all portions not sheathed are protected by approved automatic sprinkler systems in accordance with 21-2.2.3.5.

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 3 or less using Appendix F.

21-2.2.3.3 Means of Escape. Such facilities shall have at least two remotely located means of escape that do not involve windows. The arrangement shall be such that there is at least one such means of escape from each sleeping room that provides a path of travel to the outside without traversing any corridor or other space exposed to unprotected vertical openings or common living spaces, such as living rooms and kitchens (*see also Section 20-2*).

21-2.2.3.4 Interior Finish. Interior finish shall be Class A or Class B in accordance with Section 6-5. There are no requirements for interior floor finish.

Exception: Exposed portions of structural members complying with the requirements of Type IV (2HH) construction may be permitted.

21-2.2.3.5 Automatic Extinguishing Systems. Where an automatic sprinkler system is installed, either for total or partial building coverage, the system shall be in accordance with Section 7-7 and shall activate the fire alarm system in accordance with Section 7-6.

Exception No. 1: NFPA 13D, Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Mobile Homes, may be used in buildings where the characteristics of the occupancy are comparable with residential fire potentials.

Exception No. 2: Automatic sprinklers may be omitted in small compartmented areas such as closets not over 24 sq ft (2.2 sq m) and bathrooms not over 55 sq ft (5.1 sq m) provided such spaces are finished with lath and plaster, gypsum board, or materials of equivalent fire resistance.

21-2.2.3.6 Construction of Corridor Walls. The separation walls of sleeping rooms shall be capable of resisting fire for at least 20 minutes. This is considered achieved if the partitioning is sheathed on both sides with lath and plaster, gypsum board, or equivalent sheathing. Sleeping room doors shall be substantial doors, such as 1¾-in. (4.4-cm) solid bonded wood core construction, or of other construction of equal or greater stability and fire integrity. Any vision panels shall be of wired glass, not exceeding 1296 sq in. (0.84 sq m) in area each, installed in approved frames. (*See also 20-3.4.*)

Exception No. 1: 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 3 or less using Appendix F.

Exception No. 2: Corridor walls and doors that are capable of resisting the passage of smoke and which are protected by automatic sprinklers in accordance with 21-2.2.3.5 on both sides of the wall and door. In such instances, there is no limitation on the type or size of glass panels.

Exception No. 3: Sleeping arrangements not in bedrooms may be provided for nonresident staff members provided the audibility of the alarm at the sleeping area is sufficient to waken the staff who might be asleep.

21-2.2.4 Impractical Evacuation Capability.

21-2.2.4.1 Facilities housing groups classed as impractical to evacuate shall meet the requirements for facilities housing groups capable of slow evacuation (*see 21-2.2.3*) and the additional requirements of 21-2.2.4.2 through 21-2.2.4.5.

Exception: Facilities complying with 21-3.2.3.

21-2.2.4.2 Minimum Construction Requirements. Buildings may be of any type construction in accordance with Section 6-2 other than Type II (000), Type III (200) or Type V (000). (*Also see 21-2.2.4.4.*)

Exception: Buildings protected throughout by an approved supervised automatic sprinkler system in accordance with 21-2.2.4.5 may be of Type II (000), Type III (200) or Type V (000) construction.

21-2.2.4.3 Protection of Vertical Openings. All vertical openings shall be protected in accordance with 20-3.1.

Exception: The Exception to 20-3.1 may not be used.

21-2.2.4.4 Extinguishment Requirements. All facilities shall be protected throughout by an approved supervised automatic sprinkler system in accordance with 21-2.2.4.5.

21-2.2.4.5 Automatic Extinguishing Systems. Where an automatic sprinkler system is installed, either for total or partial building coverage, the system shall be in accordance with Section 7-7 and shall activate the fire alarm system in accordance with Section 7-6.

Exception: In buildings where the characteristics of the occupancy are comparable with residential fire potentials, a sprinkler system complying with NFPA 13D, Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Mobile Homes, with a 30-minute water supply may be used provided all habitable areas and closets are sprinklered. Automatic sprinklers may be omitted in bathrooms not over 55 sq ft (5.1 sq m) provided such spaces are finished with lath and plaster, gypsum board, or materials of equivalent fire resistance.

SECTION 21-3 LARGE FACILITIES

21-3.1 General.

21-3.1.1 Scope. This section applies to residential board and care occupancies providing sleeping accommodations for more than 16 residents. Normally, facilities having sleeping accommodations for not more than 16 residents will be evaluated in accordance with Section 21-2, Small Facilities. However, facilities meeting the requirements of this section are considered to meet the requirements of Section 21-2 for the same evacuation capability.

21-3.1.2 The requirements of this section are applicable to new construction and existing buildings according to the provisions of Section 1-4 of this *Code*.

21-3.2 Requirements Based on Evacuation Capability.

21-3.2.1 Large facilities shall comply with the requirements of 21-3.2 as indicated for the appropriate evacuation capability.

Exception: Large residential board and care occupancies found to have equivalent safety. One method for determining this equivalency is given in Appendix G.*

21-3.2.2 Prompt and Slow Evacuation Capabilities.

21-3.2.2.1 Facilities housing groups classed as prompt or slow shall meet the requirements for Existing Hotels and Dormitories, Chapter 17, and the additional requirements of 21-3.2.2.2 through 21-3.2.2.8.

Exception: Large residential board and care occupancies which comply with 21-3.2.3.

21-3.2.2.2 Minimum Construction Requirements. Construction requirements for large facilities shall be as required by this section. Where noted as "fully sheathed," the interior shall be covered with lath and plaster, gypsum board or equivalent sheathing.

For the purpose of construction requirements, stories shall be counted starting at the primary level of exit discharge and ending at the highest occupied level. For the purposes of this section, the primary level of exit discharge of a building shall be that floor which 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 a building.

The minimum construction requirements, based on the highest story normally used by board and care residents, are:

(a) *One- or Two-Story Facilities.* Any construction type that meets the requirements for 1-hour or greater fire resistance rating, or is Type IV (2HH), or is fully sheathed, or is protected throughout by an approved automatic sprinkler system in accordance with 21-3.2.2.6.

Exception to (a): One-story facilities having 30 or fewer residents, housing groups capable of prompt evacuation, may be of any construction.

(b) *Three- to Six-Story Facilities.* Type I, II or III construction that meets the requirements for 1-hour or greater fire resistance rating, any Type IV construction that is protected throughout by an automatic sprinkler system in accordance with 21-3.2.2.6, or any other type of construction that is both sheathed and protected throughout by an approved automatic sprinkler system in accordance with 21-3.2.2.6, other than Type V (000).

Exception to (b): Three- or four-story facilities of Type V (000) construction that are both sheathed and protected throughout by an approved automatic sprinkler system in accordance with 21-3.2.2.6.

(c) *Facilities More than Six Stories High.* Any Type I or Type II (222) construction. 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 21-3.2.2.6.

Exception to (a), (b), and (c): Any building of Type I or Type II (222 or 111) construction may include roofing systems involving combustible supports, decking, or roofing provided: (1) the roof covering meets Class A requirements in accordance with NFPA 256, Fire Tests for Roof Coverings, and (2) the roof is separated from all occupied portions of the building by a noncombustible floor assembly having at least a 2-hour fire resistance rating which includes at least 2½ in. (6.4 cm) of concrete or gypsum fill. To qualify for this exception, the attic or other space so developed shall either be unused or protected throughout by an approved automatic sprinkler system in accordance with 21-3.2.2.6.

21-3.2.2.3 Protection of Exit Route. Access shall be provided from every resident use area to at least one means of egress which is separated from all other rooms or spaces by walls and doors that equal the requirements for separation of bedrooms from corridors specified in Chapter 17.

Exception No. 1: Rooms or spaces, other than sleeping rooms, if those rooms or spaces are protected throughout by an approved automatic sprinkler system in accordance with 21-3.2.2.6.

Exception No. 2: Rooms or spaces other than sleeping rooms, if those rooms or spaces are provided with a smoke detection and alarm system connected to activate the building evacuation alarm. Furnishing, finishes, and furniture, in combination with all other combustibles within the space, are of such minimum quantity and are so arranged that a fully developed fire is unlikely to occur.

Exception No. 3: In facilities with 30 or fewer residents where the group is classed as capable of prompt evacuation and the building is not over two stories in height, walls and doors of resident use areas are only required to resist the passage of smoke.

Exception No. 4: Facilities housing groups capable of prompt evacuation in buildings not over two stories in height that have at least two remotely located means of escape that do not involve windows. The arrangement shall be such that there is at least one such means of escape from each sleeping room that provides a path of travel to the outside without traversing any corridor or other spaces exposed to unprotected vertical openings or common living spaces, such as living rooms and kitchens.

21-3.2.2.4 Interior Finish. Interior finish shall be Class A or Class B in accordance with Section 6-5. Interior floor finish shall be Class I or Class II in corridors and exits.

Exception No. 1: Exposed portions of structural members complying with the requirements of Type IV (2HH) construction may be permitted.

Exception No. 2: Previously installed floor covering, subject to the approval of the authority having jurisdiction.

21-3.2.2.5 Smoke Detection System. All corridors and common spaces shall be provided with smoke detectors in accordance with NFPA 72E, *Standard on Automatic Fire Detectors*, arranged to initiate an alarm which is audible in all sleeping areas.

Exception No. 1: Common spaces provided with approved automatic sprinkler systems in accordance with 21-3.2.2.6.

Exception No. 2: Corridors, and other spaces open to corridors, when all of the following conditions exist:

(a) The corridors are under continual direct observation by staff during all times residents are in the building;

(b) The level of observation equals or exceeds that normally provided by staff at nursing stations in hospitals or nursing homes; and

(c) The corridor is not separated from the point of observation by doors which may be closed.

Exception No. 3: Unenclosed corridors, passageways, balconies, colonades, or other arrangements where one or more sides along the long dimension is fully or extensively open to the exterior at all times.

21-3.2.2.6* Automatic Extinguishment Systems. Where an automatic sprinkler system is installed, either for total or partial building coverage, the system shall be in accordance with Section 7-7 and shall activate the fire alarm system in accordance with Section 7-6.

Exception: Automatic sprinklers may be omitted in small compartmented areas such as closets not over 24 sq ft (2.2 sq m) and bathrooms not over 55 sq ft (5.1 sq m) provided such spaces are finished with lath and plaster, gypsum board, or materials of equivalent fire resistance.

21-3.2.2.7 Portable Fire Extinguishers. Portable fire extinguishers shall be provided near hazardous areas in accordance with Section 7-7.

21-3.2.2.8 Requirements for Separation of Sleeping Rooms.

(a) Sleeping rooms shall be separated from corridors and other common spaces by walls and partitions of not less than 20-minute fire resistance rating. The wall shall be constructed to resist the passage of smoke. There shall be no louvers, transfer grilles, operable transoms or other air passages penetrating that wall except properly installed heating and utility installations.

Exception No. 1 to (a): In buildings housing groups capable of prompt evacuation, not greater than two stories in height, with a maximum of 30 residents, no fire resistance rating is

required provided the walls are constructed to resist the passage of smoke.

Exception No. 2 to (a): In buildings protected throughout by an approved automatic sprinkler system in accordance with 21-3.2.2.6, no fire resistance rating is required provided the walls are constructed to resist the passage of smoke.

(b) Doors in walls separating sleeping rooms from corridors shall have a fire protection rating of not less than 20 minutes.

Exception No. 1 to (b): Walls which are required to only resist the passage of smoke, without a fire resistance rating, may have doors which resist the passage of smoke without a fire protection rating.

Exception No. 2 to (b): Existing 1¾-in. (4.4-cm) solid bonded wood core doors.

(c) Doors in walls separating sleeping rooms from corridors shall be automatic-closing upon detection of smoke.

Exception No. 1 to (c): Self-closing doors which have occupant control locks such that access is normally restricted to the occupants or staff personnel.

Exception No. 2 to (c): In buildings protected throughout by an approved automatic sprinkler system in accordance with 21-3.2.2.6.

Exception No. 3 to (c): In buildings where the corridors involved are under continual direct observation by staff during all times residents are in the facility.

21-3.2.3 Impractical to Evacuate.

21-3.2.3.1 Facilities housing groups of persons classed as impractical to evacuate shall meet the requirements for custodial care facilities, Chapter 12 or 13, as appropriate.

Exception: Facilities found to have equivalent safety. One method of determining this equivalency is given in Appendix C using the following mandatory safety requirements.

	CONTAINMENT S_a		EXTINGUISHMENT S_b		PEOPLE MOVEMENT S_c	
ZONE LOCATION	New	Exist.	New	Exist.	New	Exist.
FIRST FLOOR	9	5	6	6	6	3
ABOVE OR BELOW FIRST FLOOR	14	9	8	8	9	5
OVER 75 ft (23 m) in HEIGHT	14	9	18	8	10	5

SECTION 21-4 SUITABILITY OF AN APARTMENT BUILDING TO HOUSE A BOARD AND CARE OCCUPANCY

21-4.1 General.

21-4.1.1 Scope. This section applies to apartment buildings that have one or more individual apartments used as a board and care occupancy. This section 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 18 or 19, as appropriate.

21-4.1.2 Requirements for individual apartments used as a residential board and care occupancy are specified in Section 21-2, Small Facilities. Egress from the apartment into the common building corridor shall be considered acceptable egress from the board and care facility.

21-4.2 Requirements Based on Evacuation Capability.

21-4.2.1 Apartment buildings housing board and care facilities shall comply with the requirements of 21-4.2.2 through 21-4.2.8.

Exception: Apartment buildings found to have equivalent safety to that required for housing of the residential board and care facility. One method for determining this equivalency is given in Appendix G.*

21-4.2.2 All facilities shall meet the requirements of Chapter 18 or 19, as appropriate, and the additional requirements of 21-4.2.3 through 21-4.2.8.

21-4.2.3 Minimum Construction Requirements. In addition to the requirements in Chapter 18 or 19, as appropriate, apartment buildings housing residential board and care facilities housing groups classed as prompt or slow shall meet the construction requirements of 21-3.2.2.2 and those housing groups classed as impractical to evaluate shall meet the construction requirements of 12-1.6 or 13-1.6 as appropriate. In applying the construction requirements, the height of the building shall be considered as the height of the residential board and care facility above grade regardless of the total height of the building.

21-4.2.4 Means of Egress. The requirements of Section 18-2 or 19-2, as appropriate, apply only to parts of the means of egress serving the apartment(s) used as residential board and care occupancy.

21-4.2.5 Interior Finish. The requirements of 18-3.3 or 19-3.3, as appropriate, apply only to parts of the means of egress serving the apartment(s) used as a residential board and care occupancy.

21-4.2.6 Construction of Corridor Walls. The requirements of 18-3.6 or 19-3.6, as appropriate, 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.

21-4.2.7 Subdivision of Building Spaces. The requirements of 18-3.7 or 19-3.7, as appropriate, apply only to those stories with an apartment(s) used as a residential board and care occupancy.

SECTION 21-5 OPERATING FEATURES

(*See Chapter 31.*)

CHAPTER 22 ONE- AND TWO-FAMILY DWELLINGS

SECTION 22-1 GENERAL REQUIREMENTS

22-1.1 Application.

22-1.1.1 This chapter establishes life safety requirements for all one- and two-family private dwellings. One- and two-family dwellings include buildings containing not more than two dwelling units in which each living unit is occupied by members of a single family with no more than three outsiders, if any, accommodated in rented rooms.

22-1.1.2 The requirements of this chapter are applicable to new buildings, and to existing or modified buildings according to the provisions of Section 1-4 of this *Code*.

22-1.2 Mixed Occupancies.

22-1.2.1 Where another type of occupancy occurs in the same building as a residential occupancy, the requirements of 1-4.7 of this *Code* shall be applicable.

22-1.2.2 For requirements on mixed mercantile and residential occupancies, see 24-1.2 or 25-1.2.

22-1.3 Definitions.

22-1.3.1 Terms applicable to this chapter are defined in Chapter 3 of this *Code*; where necessary, other terms will be defined in the text as they may occur.

22-1.4 Classification of Occupancy. (*See 22-1.1.1.*)

22-1.5 Classification of Hazard of Contents.

22-1.5.1* Building contents shall be classified according to the provisions of 4-2.1 of this *Code*.

22-1.6 Minimum Construction Requirements. No Special Requirements.

22-1.7 Occupant Load. No Requirements.

SECTION 22-2* MEANS OF ESCAPE REQUIREMENTS

22-2.1 Number of Means of Escape.

22-2.1.1 Primary Means of Escape. In any dwelling or living unit of two rooms or more, every bedroom and living area shall have at least two means of escape or alternate protection, at least one of which shall be a door or stairway providing a means of unobstructed travel to the outside of the dwelling at street or ground level. No bedroom or living area shall be accessible by only a ladder or folding stairs or through a trap door.

22-2.1.2* Second Means of Escape. The second means of escape or alternate protection shall be one of the following:

(a) A door, stairway, passage or hall providing a way, independent of and remote from the primary means of escape, of unobstructed travel to the outside of the dwelling at street or ground level.

(b) A passage through adjacent non-lockable spaces independent of and remote from the primary means of escape to any approved means of escape.

(c) An outside window or door operable from the inside without the use of tools and providing a clear opening of not less than 20 in. (50.8 cm) in width, 24 in. (61 cm) in height and 5.7 sq ft (.53 sq m) in area. The bottom of the opening shall not be more than 44 in. (112 cm) off the floor. Such means of escape shall be acceptable if:

1. The window is within 20 ft (6.1 m) of grade, or
2. The window is directly accessible to fire department rescue apparatus as approved by the authority having jurisdiction, or
3. The window or door opens onto an exterior balcony.

(d) The bedroom or living area shall be separated from all other parts of the living unit by construction having a fire resistance rating of at least 20 minutes and shall be equipped with a door that will resist passage of fire for at least 20 minutes, and is designed and installed to minimize smoke leakage. A means of providing smoke venting and fresh air to the occupants shall be provided.

Exception No. 1: A second means of escape or alternate protection is not required:

(a) If the bedroom or living area has a door leading directly to the outside of the building, at or to grade level; or

(b) If the dwelling unit is protected throughout by an approved automatic sprinkler system in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems, or NFPA 13D, Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Mobile Homes, as applicable.

Exception No. 2: Existing approved means of escape may be continued in use.

22-2.2 Arrangement of Means of Escape.

22-2.2.1 No required path of travel to the outside from any room shall be through another room or apartment not under the immediate control of the occupant of the first room or his family, nor through a bathroom or other space subject to locking.

22-2.3 Doors.

22-2.3.1 No door in the path of travel of a means of escape shall be less than 28 in. (71 cm) wide.

Exception: Bathroom doors may be 24 in. (61 cm) wide.

22-2.3.2 Every closet door latch shall be such that children can open the door from inside the closet.

22-2.3.3 Every bathroom door lock shall be designed to permit the opening of the locked door from the outside in an emergency.

22-2.3.4 Doors may be swinging or sliding and are exempt from the requirements of 5-2.1.4.1.

22-2.3.5* No door in any means of escape shall be locked against egress when the building is occupied. All locking devices which impede or prohibit egress or which cannot be easily disengaged shall be prohibited.

22-2.4 Vertical Means of Escape, Stairs.

22-2.4.1 The width, risers, and treads of every stair shall comply with the minimum requirements for Class B stairs, as described in 5-2.2. Winders and spiral stairs in accordance with Chapter 5 are permitted within a single living unit.

SECTION 22-3 PROTECTION

22-3.1 Protection of Vertical Openings. No Requirements.

22-3.2 Interior Finish.

22-3.2.1 Interior finish on walls and ceilings of occupied spaces shall be Class A, B, or C as defined in Section 6-5.

22-3.2.2 Interior Floor Finish. No Requirements.

22-3.3 Detection, Alarm and Communications Systems.

22-3.3.1 Detection. Approved single station or multiple station smoke detectors continuously powered by the house electrical service shall be installed in accordance with 7-6.2.7.

Exception No. 1: Dwelling units protected by an approved smoke detection system installed in accordance with Section 7-6 having an approved means of occupant notification.

Exception No. 2: In existing construction, approved smoke detectors powered by batteries may be used.

SECTION 22-4 (RESERVED)

SECTION 22-5 BUILDING SERVICES

22-5.1 Heating Equipment. No stove or combustion heater shall be so located as to block escape in case of fire arising from malfunctioning of the stove or heater.

CHAPTER 23 (RESERVED)

CHAPTER 24 NEW MERCANTILE OCCUPANCIES

(See also Chapter 31.)

SECTION 24-1 GENERAL REQUIREMENTS

24-1.1 Application.

24-1.1.1 New mercantile occupancies shall comply with the provisions of Chapter 24. *(See Chapter 31 for operating features.)*

24-1.1.2 This chapter establishes life safety requirements for the design of all new mercantile buildings. Specific requirements for sub-occupancy groups such as Class A, B and C stores and covered malls are contained in paragraphs pertaining thereto.

24-1.1.3 Additions to existing buildings shall conform to the requirements for new construction. Existing portions of the structure need not be modified, provided that the new construction has not diminished the fire safety features of the facility.

Exception: Existing portions shall be upgraded if the addition results in a change of mercantile subclassification (see 24-1.4.2).

24-1.2 Mixed Occupancies.

24-1.2.1 Combined Mercantile and Residential Occupancies.

24-1.2.1.1 No dwelling unit shall have its sole means of egress through any mercantile occupancy in the same building.

24-1.2.1.2 No multiple dwelling occupancy shall be located above a mercantile occupancy.

Exception No. 1: Where the dwelling occupancy and exits therefrom are separated from the mercantile occupancy by construction having a fire resistance rating of at least 1 hour.

Exception No. 2: Where the mercantile occupancy is protected throughout by an approved automatic sprinkler system in accordance with Section 7-7.

24-1.3 Special Definitions.

(a) **Class A Stores.** See 24-1.4.2.1(a).

(b) **Class B Stores.** See 24-1.4.2.1(b).

(c) **Class C Stores.** See 24-1.4.2.1(c).

(d) **Covered Mall.** A covered or roofed interior area used as a pedestrian way and connecting building(s) or portions of a building housing single and/or multiple tenants.

(e) **Open-Air Mercantile Operations.** Operations conducted outside of all structures with the operations area devoid of all walls and roofs except for small individual weather canopies.

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

(g) **Anchor Store.** A department store or major merchandising center having direct access to the covered mall but having all required means of egress independent of the covered mall.

24-1.4 Classification of Occupancy.

24-1.4.1 Mercantile occupancies shall include all buildings and structures or parts thereof with occupancy as described in 4-1.7.

24-1.4.2 Subclassification of Occupancy.

24-1.4.2.1 Mercantile occupancies shall be classified as follows:

(a) *Class A.* All stores having aggregate gross area of more than 30,000 sq ft (2800 sq m) or utilizing more than three floor levels for sales purposes.

(b) *Class B.* All stores of not more than 30,000 sq ft (2800 sq m) aggregate gross area, but more than 3,000 sq ft (280 sq m), or utilizing any balconies, mezzanines *(see 24-1.4.2.3)*, or floors above or below the street floor level for sales purposes.

Exception to (b): If more than three floors are utilized, the store shall be Class A, regardless of area.

(c) *Class C.* All stores of not more than 3,000 sq ft (280 sq m) gross area used for sales purposes on one story only. *(Balcony permitted, see 24-1.4.2.3.)*

24-1.4.2.2 For the purpose of the classification in 24-1.4.2.1, the aggregate gross area shall be the total gross area of all floors used for mercantile purposes and, where a store is divided into sections, regardless of fire separation, 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 above classifications, but exits shall be provided for such nonsales areas in accordance with their occupancy, as specified by other chapters of this *Code*.

24-1.4.2.3* A balcony or mezzanine floor having an area less than one-half of the floor below shall not be counted as a floor level for the purpose of applying the classification of 24-1.4.2.1, but if there are two balcony or mezzanine floors, one shall be counted.

24-1.4.2.4 Where a number of stores under different management are located in the same building or in adjoining buildings with no fire wall or other standard fire separations between, the aggregate gross area of all such stores shall be used in determining classification per 24-1.4.2.1.

Exception: Covered malls (see 24-4.3).

24-1.5 Classification of Hazard of Contents. Mercantile occupancies contents shall be classed as ordinary hazard in accordance with Section 4-2.

Exception: 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:

(a) Exits shall be located so that not more than 75 ft (23 m) of travel from any point is required to reach the nearest exit.

(b) From every point there shall be at least two exits accessible by travel in different directions (no common path of travel).

(c) All vertical openings shall be enclosed.

24-1.6 Minimum Construction Requirements. No Special Requirements.

24-1.7 Occupant Load.

24-1.7.1* For purposes of determining required exits, the occupant load of mercantile buildings or parts of buildings used for mercantile purposes shall be not less than the following:

(a) Street floor, one person for each 30 sq ft (2.8 sq m) gross floor area of sales space. In stores with no street floor, as defined in Chapter 3, but with access directly from the street by stairs or escalators, the principal floor at the point of entrance to the store shall be considered the street floor.

Exception to (a): In stores where, due to differences in grade of streets on different sides, there are two or more floors directly accessible from streets (not including alleys or similar back streets), for the purpose of determining occupant load, each such floor shall be considered a street floor. The occupant load factor shall be one person for each 40 sq ft (3.7 sq m) gross floor area of sales space.

(b) Sales floors below the street floor — same as street floor.

(c) Upper floors, used for sales — one person for each 60 sq ft (5.6 sq m) gross floor area of sales space.

(d) Floors or portions of floors used only for offices — one person for each 100 sq ft (9.3 sq m) gross floor area of office space.

(e) Floors or portions of floors used only for storage, receiving, shipping and not open to the general public — one person per each 300 sq ft (27.9 sq m) gross area of storage, receiving, or shipping space.

(f) Floors or portions of floors used for assembly purposes — occupant load determined in accordance with Chapter 8 for such assembly occupancies.

(g)* Mall buildings — determined in accordance with 24-1.7.1(a) through (f).

Exception: The covered mall, when considered a pedestrian way (see Exception to 24-4.3.1), shall not be assessed an occupant load. However, means of egress from the mall shall be provided for an occupant load determined by dividing the gross leasable area (not including anchor stores) by the appropriate occupant load factor listed below:

Gross Leasable Area [See 24-1.3(f).] (sq ft)	*Occupant Load Factor*
Less than 150,000 (14,000 sq m)	*30*
Over 150,000 (14,000 sq m) but less than 200,000 (18,500 sq m)	*35*
Over 200,000 (18,500 sq m) but less than 250,000 (23,000 sq m)	*40*
Over 250,000 (23,000 sq m) but less than 300,000 (28,000 sq m)	*45*
Over 300,000 (28,000 sq m) but less than 400,000 (37,000 sq m)	*50*
Over 400,000 (37,000 sq m)	*55*

Each individual tenant space shall have means of egress to the outside and/or to the mall based on occupant loads figured utilizing 24-1.7.1 (a) through (f).

Each individual anchor store shall have means of egress independent of the covered mall.

24-1.7.2 In case of mezzanines or balconies open to the floor below or other unprotected vertical openings between floors as permitted by the Exceptions to 24-3.1, the occupant load (or area) of the mezzanine or other subsidiary floor level shall be added to that of the street floor for the purpose of determining required exits, provided, however, that in no case shall the total number of exit units be less than would be required if all vertical openings were enclosed.

SECTION 24-2 MEANS OF EGRESS REQUIREMENTS

24-2.1 General.

24-2.1.1 All means of egress shall be in accordance with Chapter 5 and this chapter.

24-2.1.2* Where a stair or ramp serves two or more upper floors, the same stair or other exit required to serve any one upper floor may also serve other upper floors.

Exception: No inside open stairway or ramp may serve as a required egress facility from more than one floor.

24-2.1.3 Where there are two or more floors below the street floor, the same stair or other exit may serve all floors (same principle as stated in 24-2.1.2 for upper floors), but all required exits from such areas shall be independent of any open stairways between the street floor and the floor below it.

24-2.1.4 Where a level outside exit from upper floors is possible owing to hills, such outside exits may 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 classed as a street floor in accordance with the definition in Chapter 3, and is subject to the requirements of this section for street floors.

24-2.1.5 For special considerations with contents of high hazard, see 24-1.5.

24-2.2 Types of Exits.

24-2.2.1* Exits shall be restricted to the following permissible types:

(a) *Doors (see 5-2.1).*
(b) *Stairs (see 5-2.2).*
(c) *Smokeproof enclosures (see 5-2.3).*
(d) *Horizontal exits (see 5-2.4).*
(e) *Ramps (see 5-2.5).*
(f) *Exit passageways (see 5-2.6).*
(g) *Revolving doors (see 5-2.1.10).*

24-2.3 Capacity of Means of Egress.

24-2.3.1 The capacity of means of egress shall be in accordance with Section 5-3.

24-2.3.2 In Class A and Class B stores, street floor exits shall be sufficient for the occupant load of the street floor plus the capacity of stairs and ramps discharging through the street floor.

24-2.4 Number of Exits.

24-2.4.1 In Class A and Class B stores, at least two separate exits shall be accessible from every part of every floor, including floors below the street floor.

24-2.4.2 In Class C stores, at least two separate exits shall be provided as specified by 24-2.4.1.

Exception No. 1: Where no part of the Class C store is more than 50 ft (15 m), measured in accordance with 5-6.2, from the exit or covered mall, when it is considered as a pedestrian way, a single exit shall be permitted.

Exception No. 2: Where no part of the Class C store is more than 75 ft (23 m) from the exit, measured in accordance with 5-6.2, and the story on which it is located is protected throughout by an approved automatic sprinkler system in accordance with Section 7-7, a single exit shall be permitted.

24-2.5 Arrangement of Means of Egress.

24-2.5.1 Exits shall be arranged in accordance with Section 5-5.

24-2.5.2* No dead-end corridor shall exceed 20 ft (6.1 m).

Exception: In buildings protected throughout by an approved supervised automatic sprinkler system, dead-end corridors shall not exceed 50 ft (15 m).

24-2.5.3 No common path of travel shall exceed 50 ft (15 m).

Exception: A common path of travel may be permitted for the first 75 ft (23 m) in a building protected throughout by an approved supervised automatic sprinkler system in accordance with Section 7-7.

24-2.5.4 Aisles leading to each exit are required. The aggregate width of such aisles shall be equal to at least the required width of the exit.

24-2.5.5 In no case shall any required aisle be less than 36 in. (91 cm) in clear width.

24-2.5.6 In Class A stores, at least one aisle of 5 ft (152 cm) minimum width shall lead directly to an exit.

24-2.5.7 If the only means of customer entrance is through one exterior wall of the building, two-thirds of the required exit width shall be located in this wall.

24-2.5.8 At least one-half of the required exits shall be so located as to be reached without going through check-out stands. In no case shall check-out stands or associated railings or barriers obstruct exits, required aisles or approaches thereto.

24-2.5.9* 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 may obstruct means of egress.

24-2.5.10 Exit access in all Class C stores, and exit access in Class B stores which have an occupant load not exceeding 200 and are protected throughout by an approved automatic sprinkler system may pass through storerooms providing the following conditions are met:

(a) Not more than 50 percent of exit access is provided through the storeroom.

(b) The storeroom is not subject to locking.

(c) The main aisle through the storeroom shall be not less than 44 in. (112 cm) wide.

(d) The path of travel, defined with fixed barriers, through the storeroom shall be direct and continuously maintained in an unobstructed condition.

24-2.6 Travel Distance to Exits. Travel distance to exits, measured in accordance with Section 5-6, shall be no more than 100 ft (30 m).

Exception: An increase in the above travel distance to 150 ft (45 m) shall be permitted in a building protected throughout by an approved automatic sprinkler system in accordance with Section 7-7.

24-2.7* Discharge from Exits. In buildings protected throughout by an approved automatic sprinkler system in accordance with Section 7-7, one-half of rated number of exit units of stairs or ramps serving as required exits from floors above or below the street floor may discharge through the main street floor area, instead of directly to the street, or through an exit passageway to the street, provided that:

(a) Not more than one-half of the required exit units from any single floor considered separately discharge through the street floor area.

(b) The exits are enclosed in accordance with Section 6-2 to the street floor.

(c) The distance of travel from the termination of the enclosure to an outside street door is not more than 50 ft (15 m).

(d) The street floor doors provide sufficient units of exit width to serve exits discharging through the street floor in addition to the street floor itself, per 24-2.3.2.

24-2.8 Illumination of Means of Egress. Every mercantile occupancy shall have means of egress illumination in accordance with Section 5-8.

24-2.9 Emergency Lighting. Every Class A and Class B store shall have emergency lighting facilities conforming to Section 5-9.

24-2.10 Marking of Means of Egress. Every mercantile occupancy shall have exit signs in accordance with Section 5-10.

Exception: Where an exit is immediately apparent from all portions of the sales area, the exit marking may be omitted.

24-2.11 Special Features.

24-2.11.1 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 with the exit travel.

24-2.11.2* Locks in accordance with Exception No. 2 of 5-2.1.5.1 shall be permitted only on principal entrance/exit doors.

24-2.11.3 Special locking arrangements in accordance with 5-2.1.6 are permitted.

24-2.11.4 Selected doors on stairwells may be equipped with hardware that prevents reentry in accordance with 5-2.1.5.2 Exception No. 1.

24-2.11.5 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 be in accordance with the provisions of 5-2.1.4.1 Exception No. 3.

24-2.11.6 Spiral stairs in accordance with 5-2.2.2.4 are permitted.

SECTION 24-3 PROTECTION

24-3.1* Protection of Vertical Openings. Each stairway, elevator shaft, escalator opening or other vertical opening shall be enclosed or protected in accordance with Section 6-2.

Exception No. 1: As permitted in Class A stores where:

(a) Openings may be unprotected between any two floors, such as open stairs or escalators between the street floor and the floor below, or between the street floor and mezzanine or second floor.

(b) Openings may be unprotected both to the floor below and to the floor above the street floor, or to balconies or mezzanines above the street floor.

(c) Openings may be unprotected under the conditions permitted by 6-2.2.3.4.

Exception No. 2: As permitted in Class B stores where:

(a) In stores protected throughout by an approved automatic sprinkler system in accordance with Section 7-7, openings may be unprotected between any two floors, such as open stairs or escalators between the street floor and the floor below, or between the street floor and mezzanine or second floor.

(b) In stores protected throughout by an approved automatic sprinkler system in accordance with Section 7-7, openings may be unprotected both to the floor below and to the floor above the street floor, or to balconies or mezzanines above the street floor.

(c) Openings may be unprotected under the conditions permitted by 6-2.2.3.4.

Exception No. 3: As permitted in Class C stores where:

(a) In any store, openings may be unprotected between the street floor and balcony.

Exception No. 4: Atriums in accordance with 24-4.4 are permitted.

24-3.2 Protection from Hazards.

24-3.2.1 An area used for general storage, boiler or furnace rooms, fuel storage, janitor closets, maintenance shops including woodworking and painting areas, and kitchens shall be separated from other parts of the building by construction having a fire resistance rating of not less than 1 hour, and all openings shall be protected with self-closing fire doors.

Exception: Areas protected by an automatic extinguishing system.

24-3.2.2 Isolated hazardous areas may be protected in accordance with 7-7.1.2.

24-3.2.3 Areas with high hazard contents as defined in Section 4-2 shall be provided with both fire-resistive separation and automatic sprinkler protection.

24-3.3 Interior Finish.

24-3.3.1 Interior finish on walls and ceilings shall be Class A or B, in accordance with Section 6-5.

Exception: In any mercantile occupancy, exposed portions of structural members complying with the requirements for heavy timber construction may be permitted. Laminated wood shall not delaminate under the influence of heat.

24-3.3.2 Interior Floor Finish. No Requirements.

24-3.4 Detection, Alarm and Communications Systems.

24-3.4.1 General. Class A mercantile occupancies shall be provided with a fire alarm system in accordance with Section 7-6.

24-3.4.2 Initiation. Initiation of the required fire alarm system shall be by manual means per 7-6.2.1(a).

Exception No. 1: Initiation may be by means of an approved automatic fire detection system, in accordance with 7-6.2.1(b), providing protection throughout the building.

Exception No. 2: Initiation may be by means of an approved automatic sprinkler system, in accordance with 7-6.2.1(c), providing protection throughout the building.

24-3.4.3 Notification.

24-3.4.3.1 At all times that the store is occupied (*see 5-2.1.1.3*) the required fire alarm system shall:

(a) Sound a general audible alarm throughout the store, or

(b) Sound an audible alarm in a continuously attended location for purposes of initiating emergency action.

24-3.4.3.2 Occupant Notification. Occupant notification shall be by live voice public address system announcement originating from the attended location where the alarm signal is received (*see 24-3.4.3.1*). The system may be used for other announcements (*see 7-6.3.9 Exception No. 2*).

Exception: Any other occupant notification means permitted by 7-6.3 may be used in lieu of live voice public address system announcement.

24-3.4.3.3 Emergency Forces Notification. Emergency forces notification shall include notifying:

(a) The fire department in accordance with 7-6.4, and

(b) The local fire brigade, if provided, via the attended location where the alarm signal is received (*see 24-3.4.3.1*).

24-3.5 Extinguishment Requirements.

24-3.5.1 Mercantile occupancies shall be protected throughout by an approved automatic sprinkler system in accordance with Section 7-7 as follows:

(a) In all buildings three or more stories in height.

(b) In all buildings with a story over 12,000 sq ft (1100 sq m).

(c) In all buildings exceeding 24,000 sq ft (2200 sq m) in gross area.

(d) Throughout stories below the level of exit discharge when such stories have an area exceeding 2,500 sq ft (230 sq m) when used for the sale, storage, or handling of combustible goods and merchandise.

24-3.5.2 Automatic sprinkler systems in Class A stores shall be supervised in accordance with 7-7.2.

24-3.5.3 Portable fire extinguishers shall be provided in all mercantile occupancies in accordance with 7-7.4.1.

24-3.6 Corridors.

24-3.6.1 Where access to exits is limited to corridors, such corridors shall be separated from use areas by fire barriers having a fire resistance rating of at least 1 hour.

Exception No. 1: Where exits are available from an open floor area.

Exception No. 2: Corridors need not have a fire resistance rating within a space occupied by a single tenant.

Exception No. 3: Corridors need not have a fire resistance rating within buildings protected throughout by an approved automatic sprinkler system.

24-3.6.2 Doors and frames, each with a minimum 20-minute fire protection rating, equipped with a positive latch and closing device, shall be used to protect openings in 1-hour partitions separating the corridor from use areas.

24-3.6.3 Glass vision panels within 1-hour fire-rated partitions, or doors therein, shall be limited to fixed wired glass in approved steel frames and shall be 1,296 sq in. (.84 sq m) or less in size per panel.

24-3.7 Subdivision of Building Spaces. No Special Requirements.

24-3.8 Special Features.

SECTION 24-4 SPECIAL PROVISIONS

24-4.1 Windowless or Underground Buildings. (*See Section 30-7.*)

24-4.2 Open-Air Mercantile Operations.

24-4.2.1 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 so arranged and conducted as to maintain free and unobstructed ways of travel at all times to permit 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.

24-4.2.2 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 shall not be construed to constitute buildings for the purpose of this *Code*.

24-4.3. Covered Malls. The purpose of this section is to establish minimum standards of life safety for covered malls having not more than three levels.

24-4.3.1 The covered mall and all buildings connected thereto shall be treated as a single building for the purposes of calculation of means of egress and shall be subject to the requirements for appropriate occupancies. The covered mall shall be at least of sufficient clear width to accommodate egress requirements as set forth in other sections of this *Code*.

Exception: The covered mall may be considered to be a pedestrian way, in which case the distance of travel within a tenant space to an exit or to the covered mall shall be a maximum of 150 ft (45 m) (see Exception to 24-2.6), or shall be the maximum for the appropriate occupancy; plus 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 at least of sufficient clear width to accommodate egress requirements as set forth in other sections of this chapter, but in no case less than 20 ft (6.1 m) wide in its narrowest dimension.

(b) The covered mall shall be provided with an unobstructed exit access on each side of the mall floor area 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 minimum of three units of exit width. (See 24-4.3.2.)*

(c) The covered mall and all buildings connected thereto shall be protected throughout by an approved electrically supervised automatic sprinkler system in accordance with Section 7-7.

(d) Walls dividing stores from each other shall extend from the floor to the underside of the roof deck or floor deck above. No separation is required between a tenant space and the covered mall.

(e) The covered mall shall be provided with a smoke control system.*

24-4.3.2 Exit Details.

24-4.3.2.1 Every floor of a covered mall shall have no less than two exits located remote from each other.

24-4.3.2.2 No less than one-half the required exit widths for each Class A or Class B store connected to a covered mall shall lead directly outside without passage through the mall.

24-4.3.2.3* Each individual anchor store shall have means of egress independent of the covered mall.

24-4.3.2.4 Every covered mall shall be provided with unobstructed exit access, parallel to and adjacent to the connected buildings. This exit access shall extend to each mall exit.

24-4.3.3 Detection, Alarm and Communications Systems.

24-4.3.3.1 General. Covered malls shall be provided with a fire alarm system in accordance with Section 7-6.

24-4.3.3.2 Initiation. Initiation of the required fire alarm system shall be by the approved automatic sprinkler system in accordance with 7-6.2.1(c).

24-4.3.3.3 Notification. At all times that the store is occupied (*see 5-2.1.1.3*) the required fire alarm system shall:

(a) Sound a general audible alarm throughout the store, or

(b) Sound an audible alarm in a continuously attended location for purposes of initiating emergency action.

24-4.3.3.4 Occupant Notification. Occupant notification shall be by live voice public address system announcement originating from the attended location where the alarm signal is received (*see 24-4.3.3.3*). The system may be used for other announcements (*see 7-6.3.9 Exception No. 2*).

Exception: Any other occupant notification means permitted by 7-6.3 may be used in lieu of live voice public address system announcement.

24-4.3.3.5 Emergency Forces Notification. Emergency forces notification shall include notifying:

(a) The fire department in accordance with 7-6.4, and

(b) The local fire brigade, if provided, via the attended location where the alarm signal is received (*see 24-4.3.3.3*).

24-4.3.3.6 Emergency Control. The fire alarm system shall be arranged to automatically actuate smoke management or smoke control systems in accordance with 7-6.5.2(d).

24-4.4 Atriums.

24-4.4.1 Atriums are permitted provided they comply with 6-2.2.3.5 and 24-4.4.2 through 24-4.4.6.

24-4.4.2 The occupancy within the atrium meets the specifications for classification as low hazard contents. (*See 4-2.2.2.*)

24-4.4.3 The automatic sprinkler system required by 6-2.2.3.5(e) shall be electrically supervised.

24-4.4.4 The atrium is provided with an automatic ventilation system operated by all of the following:

(a) Approved smoke detectors located at the top of the space and adjacent to each return air intake from the atrium, and

(b) The required automatic fire extinguishing system, and

(c) Manual controls which are readily accessible to the fire department.

24-4.4.5 Detection, Alarm and Communications Systems.

24-4.4.5.1 General. Buildings housing atriums shall be provided with a fire alarm system in accordance with Section 7-6.

24-4.4.5.2 Initiation. Initiation of the required fire alarm system shall be by both:

(a) Activation of the smoke detection system [*see 7-6.2.1(b)*], and

(b) Activation of the automatic sprinkler system [*see 7-6.2.1(c)*].

Manual pull stations are not required.

24-4.4.5.3 Notification. At all times that the store is occupied (*see 5-2.1.1.3*) the required fire alarm system shall:

(a) Sound a general audible alarm throughout the store, or

(b) Sound an audible alarm in a continuously attended location for purposes of initiating emergency action.

24-4.4.5.4 Occupant Notification. Occupant notification shall be by live voice public address system announcement originating from the attended location where the alarm signal is received (*see 24-4.4.5.3*). The system may be used for other announcements (*see 7-6.3.9 Exception No. 2*).

Exception: Any other occupant notification means permitted by 7-6.3 may be used in lieu of live voice public address system announcement.

24-4.4.5.5 Emergency Forces Notification. Emergency forces notification shall include notifying:

(a) The fire department in accordance with 7-6.4, and

(b) The local fire brigade, if provided.

24-4.4.5.6 Emergency Control. The fire alarm system shall be arranged to automatically actuate smoke management or smoke control systems in accordance with 7-6.5.2(d).

24-4.4.6 All electrical equipment essential for smoke control or automatic extinguishing equipment for buildings more than six stories or 75 ft (23 m) in height containing an atrium shall be provided with an emergency source of power in accordance with NFPA 70, *National Electrical Code*, Section 700-12(b), or equivalent.

24-4.5 Operating Features. (*See Chapter 31.*)

SECTION 24-5 BUILDING SERVICES

24-5.1 Utilities shall comply with the provisions of Section 7-1.

24-5.2 Heating, ventilating and air conditioning equipment shall comply with the provisions of Section 7-2.

24-5.3 Elevators, dumbwaiters and vertical conveyors shall comply with the provisions of Section 7-4.

24-5.4 Rubbish chutes, incinerators and laundry chutes shall comply with the provisions of Section 7-5.

CHAPTER 25 EXISTING MERCANTILE OCCUPANCIES

(See also Chapter 31.)

SECTION 25-1 GENERAL REQUIREMENTS

25-1.1 Application.

25-1.1.1 Existing mercantile occupancies shall comply with the provisions of Chapter 25 (*see Chapter 31 for operating features*).

25-1.1.2 This chapter establishes life safety requirements for existing buildings. Specific requirements for sub-occupancy groups such as Class A, B and C stores and covered malls are contained in paragraphs pertaining thereto.

25-1.1.3 Additions to existing buildings shall conform to the requirements for new construction. Existing portions of the structure need not be modified, provided that the new construction has not diminished the fire safety features of the facility.

Exception: Existing portions shall be upgraded if the addition results in a change of mercantile subclassification (see 25-1.4.2).

25-1.2 Mixed Occupancies.

25-1.2.1 Combined Mercantile and Residential Occupancies.

25-1.2.1.1 No dwelling unit shall have its sole means of egress through any mercantile occupancy in the same building.

25-1.2.1.2 No multiple dwelling occupancy shall be located above a mercantile occupancy.

Exception No. 1: Where the dwelling occupancy and exits therefrom are separated from the mercantile occupancy by construction having a fire resistance rating of at least 1 hour.

Exception No. 2: Where the mercantile occupancy is protected throughout by an approved automatic sprinkler system in accordance with Section 7-7.

Exception No. 3: As permitted in 25-1.2.1.3.

25-1.2.1.3 A building with not more than two dwelling units above a mercantile occupancy shall be permitted provided that the mercantile occupancy is protected by an automatic fire detection system in accordance with Section 7-6.

25-1.3 Special Definitions.

(a) **Class A Stores.** See 25-1.4.2.1(a).

(b) **Class B Stores.** See 25-1.4.2.1(b).

(c) **Class C Stores.** See 25-1.4.2.1(c).

(d) **Covered Mall.** A covered or roofed interior area used as a pedestrian way and connecting building(s) or portions of a building housing single and/or multiple tenants.

(e) **Open-Air Mercantile Operations.** Operations conducted outside of all structures with the operations area devoid of all walls and roofs except for small individual weather canopies.

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

(g) **Anchor Store.** A department store or major merchandising center having direct access to the covered mall but having all required means of egress independent of the covered mall.

25-1.4 Classification of Occupancy.

25-1.4.1 Mercantile occupancies shall include all buildings and structures or parts thereof with occupancy as described in 4-1.7.

25-1.4.2 Subclassification of Occupancy.

25-1.4.2.1 Mercantile occupancies shall be classified as follows:

(a) *Class A.* All stores having aggregate gross area of more than 30,000 sq ft (2800 sq m), or utilizing more than three floor levels for sales purposes.

(b) *Class B.* All stores of not more than 30,000 sq ft (2800 sq m) aggregate gross area, but more than 3,000 sq ft (280 sq m), or utilizing any balconies, mezzanines (*see 25-1.4.2.3*), or floors above or below the street floor level for sales purposes.

Exception to (b): If more than three floors are utilized, the store shall be Class A, regardless of area.

(c) *Class C.* All stores of not more than 3,000 sq ft (280 sq m) gross area used for sales purposes on one story only. (*Balcony permitted, see 25-1.4.2.3.*)

25-1.4.2.2 For the purpose of the classification in 25-1.4.2.1, the aggregate gross area shall be the total gross area of all floors, used for mercantile purposes and, where a store is divided into sections, regardless of fire separation, 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 above classifications, but exits shall be provided for such nonsales areas in accordance with their occupancy, as specified by other chapters of this *Code*.

25-1.4.2.3* A balcony or mezzanine floor having an area less than one-half of the floor below shall not be counted as a floor level for the purpose of applying the classification of 25-1.4.2.1, but if there are two balcony or mezzanine floors, one shall be counted.

25-1.4.2.4 Where a number of stores under different management are located in the same building or in adjoining buildings with no fire wall or other standard fire separations between, the aggregate gross area of all such stores shall be used in determining classification per 25-1.4.2.1.

Exception: Covered malls (see 25-4.3).

25-1.5 Classification of Hazard of Contents. Mercantile occupancies contents shall be classed as ordinary hazard in accordance with Section 4-2.

Exception: 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:

(a) Exits shall be located so that not more than 75 ft (23 m) of travel from any point is required to reach the nearest exit.

(b) From every point there shall be at least two exits accessible by travel in different directions (no common path of travel).

(c) All vertical openings shall be enclosed.

25-1.6 Minimum Construction Requirements. No Special Requirements.

25-1.7 Occupant Load.

25-1.7.1* For purposes of determining required exits, the occupant load of mercantile buildings or parts of buildings used for mercantile purposes shall be not less than the following:

(a) Street floor, one person for each 30 sq ft (2.8 sq m) gross floor area of sales space. In stores with no street floor as defined in Chapter 3, but with access directly from the street by stairs or escalators, the principal floor at the point of entrance to the store shall be considered the street floor.

Exception to (a): In stores where, due to differences in grade of streets on different sides, there are two or more floors directly accessible from streets (not including alleys or similar back streets), for the purpose of determining occupant load each such floor shall be considered a street floor. The occupant load factor shall be one person for each 40 sq ft (3.7 sq m) gross floor area of sales space.

(b) Sales floors below the street floor — same as street floor.

(c) Upper floors, used for sales — one person for each 60 sq ft (5.6 sq m) gross floor area of sales space.

(d) Floors or portions of floors used only for offices — one person for each 100 sq ft (9.3 sq m) gross floor area of office space.

(e) Floors or portions of floors used only for storage, receiving, shipping and not open to the general public — one person per each 300 sq ft (27.9 sq m) gross area of storage, receiving, or shipping space.

(f) Floors or portions of floors used for assembly purposes — occupant load determined in accordance with Chapter 9 for such assembly occupancies.

(g)* Mall buildings — determined in accordance with 25-1.7.1(a) through (f).

Exception: The covered mall, when considered a pedestrian way (see Exception to 25-4.3.1), shall not be assessed an occupant load. However, means of egress from the mall shall be provided for an occupant load determined by dividing the gross leasable area (not including anchor stores) by the appropriate occupant load factor listed below:

Gross Leasable Area [See 25-1.3(f).] (sq ft)	*Occupant Load Factor*
Less than 150,000 (14,000 sq m)	*30*
Over 150,000 (14,000 sq m) but less than 200,000 (18,500 sq m)	*35*
Over 200,000 (18,500 sq m) but less than 250,000 (23,000 sq m)	*40*
Over 250,000 (23,000 sq m) but less than 300,000 (28,000 sq m)	*45*
Over 300,000 (28,000 sq m) but less than 400,000 (37,000 sq m)	*50*
Over 400,000 (37,000 sq m)	*55*

Each individual tenant space shall have means of egress to the outside and/or to the mall based on occupant loads figured utilizing 25-1.7.1 (a) through (f).

Each individual anchor store shall have means of egress independent of the covered mall.

25-1.7.2 In case of mezzanines or balconies open to the floor below or other unprotected vertical openings between floors as permitted by the Exceptions to 25-3.1 the occupant load (or area) of the mezzanine or other subsidiary floor level shall be added to that of the street floor for the purpose of determining required exits, provided, however, that in no case shall the total number of exit units be less than would be required if all vertical openings were enclosed.

SECTION 25-2 MEANS OF EGRESS REQUIREMENTS

25-2.1 General.

25-2.1.1 All means of egress shall be in accordance with Chapter 5 and this chapter.

25-2.1.2* Where a stair, escalator, or ramp serves two or more upper floors, the same stair or other exit required to serve any one upper floor may also serve other upper floors.

Exception: No inside open stairway, escalator, or ramp may serve as a required egress facility from more than one floor.

25-2.1.3 Where there are two or more floors below the street floor, the same stair or other exit may serve all floors (same principle as stated in 25-2.1.2 for upper floors), but all required exits from such areas shall be independent of any open stairways between the street floor and the floor below it.

25-2.1.4 Where a level outside exit from upper floors is possible owing to hills, such outside exits may 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 classed as a street floor in accordance with the definition of Chapter 3, and is subject to the requirements of this section for street floors.

25-2.1.5 For special considerations with contents of high hazard, see 25-1.5.

25-2.2 Types of Exits.

25-2.2.1* Exits shall be restricted to the following permissible types:

(a) *Doors (see 5-2.1).*

(b) *Stairs, Class A or B (see 5-2.2).*

(c) *Smokeproof enclosures (see 5-2.3).*

(d) *Horizontal exits (see 5-2.4).*

(e) *Ramps (see 5-2.5).*

(f) *Exit passageways (see 5-2.6).*

(g) *Escalators (see 5-2.7).*

(h) *Revolving doors (see 5-2.1.10).*

(i) *Fire escape stairs (see 5-2.8).*

25-2.3 Capacity of Means of Egress.

25-2.3.1 The capacity of means of egress shall be in accordance with Section 5-3.

25-2.3.2 In Class A and Class B stores, street floor exits shall be sufficient for the occupant load of the street floor and the capacity of stairs, ramps, escalators and moving walks discharging through the street floor.

25-2.4 Number of Exits.

25-2.4.1 In Class A and Class B stores, at least two separate exits shall be accessible from every part of every floor, including floors below the street floor.

25-2.4.2 In Class C stores, at least two separate exits shall be provided as specified by 25-2.4.1.

Exception No. 1: Where no part of the Class C store is more than 50 ft (15 m), measured in accordance with 5-6.2, from the exit or covered mall, when it is considered as a pedestrian way, a single exit shall be permitted.

Exception No. 2: Where no part of the Class C store is more than 75 ft (23 m) from the exit, measured in accordance with 5-6.2, and the story on which it is located is protected throughout by an approved automatic sprinkler system in accordance with Section 7-7, a single exit shall be permitted.

25-2.5 Arrangement of Means of Egress.

25-2.5.1 Exits shall be arranged in accordance with Section 5-5.

25-2.5.2* No dead-end corridor shall exceed 50 ft (15 m).

Exception: Existing dead-end corridors exceeding 50 ft (15 m) may be continued in use subject to the approval of the authority having jurisdiction and the travel distance requirements of 25-2.6.*

25-2.5.3 No common path of travel shall exceed 50 ft (15 m).

Exception No. 1: A common path of travel may be permitted for the first 100 ft (30 m) on a story protected throughout by an approved automatic sprinkler system in accordance with Section 7-7 or for the first 75 ft (23 m) on stories protected throughout by a complete approved supervised automatic smoke detection system which, upon activation, sounds an alarm on that floor.

Exception No. 2: Existing excessive common paths of travel may be continued in use subject to the approval of the authority having jurisdiction and the travel distance requirements of 25-2.6.*

25-2.5.4 Aisles leading to each exit are required. The aggregate width of such aisles shall be equal to at least the required width of the exit.

25-2.5.5 In no case shall any required aisle be less than 28 in. (71 cm) in clear width.

25-2.5.6 In Class A stores, at least one aisle of 5 ft (152 cm) minimum width shall lead directly to an exit.

25-2.5.7 If the only means of customer entrance is through one exterior wall of the building, two-thirds of the required exit width shall be located in this wall.

25-2.5.8 At least one-half of the required exits shall be so located as to be reached without going through check-out stands. In no case shall check-out stands or associated railings or barriers obstruct exits, required aisles or approaches thereto.

25-2.5.9* 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 may obstruct means of egress.

25-2.5.10 Exit access in Class A stores protected throughout with an approved supervised automatic sprinkler system in accordance with Section 7-7 and in all Class B or Class C stores may pass through storerooms providing the following conditions are met:

(a) Not more than 50 percent of exit access is provided through the storeroom.

(b) The storeroom is not subject to locking.

(c) The main aisle through the storeroom shall be not less than 44 in. (112 cm) wide.

(d) The path of travel defined with fixed barriers through the storeroom shall be direct and continuously maintained in an unobstructed condition.

25-2.6 Travel Distance to Exits. Travel distance to exits, measured in accordance with Section 5-6, shall be no more than 100 ft (30 m).

Exception: An increase in the above travel distance to 150 ft (45 m) shall be permitted in a building protected throughout by an approved automatic sprinkler system in accordance with Section 7-7.

25-2.7* Discharge from Exits. In buildings protected throughout by an approved automatic sprinkler system in accordance with Section 7-7, one-half of rated number of exit units of stairs, escalators or ramps serving as required exits from floors above or below the street floor may discharge through the main street floor area, instead of directly to the street, or through an exit passageway to the street, provided that:

(a) Not more than one-half of the required exit units from any single floor considered separately discharge through the street floor area.

(b) The exits are enclosed in accordance with Section 6-2 to the street floor.

(c) The distance of travel from the termination of the enclosure to an outside street door is not more than 50 ft (15 m).

(d) The street floor doors provide sufficient units of exit width to serve exits discharging through the street floor in addition to the street floor itself, per 25-2.3.2.

25-2.8 Illumination of Means of Egress. Every mercantile occupancy shall have means of egress illumination in accordance with Section 5-8.

25-2.9 Emergency Lighting. Every Class A and Class B store shall have emergency lighting facilities conforming to Section 5-9.

25-2.10 Marking of Means of Egress. Every mercantile occupancy shall have exit signs in accordance with Section 5-10.

Exception: Where an exit is immediately apparent from all portions of the sales area, the exit marking may be omitted.

25-2.11 Special Features.

25-2.11.1 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 with the exit travel.

25-2.11.2* Locks in accordance with Exception No. 2 of 5-2.1.5.1 shall be permitted only on principal entrance/exit doors.

25-2.11.3 Special locking arrangements in accordance with 5-2.1.6 are permitted.

25-2.11.4 The reentry provisions of 5-2.1.5.2 need not be met (*see 5-2.1.5.2 Exception No. 3*).

25-2.11.5 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 be in accordance with the provisions of 5-2.1.4.1 Exception No. 3.

25-2.11.6 Spiral stairs in accordance with 5-2.2.2.4 are permitted.

25-2.11.7 Winders in stairs in accordance with 5-2.2.2.5 are permitted.

25-2.11.8 In Class C mercantile occupancies, doors may swing inward where such doors serve only the street floor area.

SECTION 25-3 PROTECTION

25-3.1* Protection of Vertical Openings. Each stairway, elevator shaft, escalator opening or other vertical opening shall be enclosed or protected in accordance with Section 6-2.

Exception No. 1: As permitted in Class A stores where:

(a) Openings may be unprotected between any two floors, such as open stairs or escalators between the street floor and the floor below, or between the street floor and mezzanine or second floor.

(b) In stores protected throughout by an approved automatic sprinkler system in accordance with Section 7-7, openings may be unprotected both to the floor below and to the floor above the street floor, or to balconies or mezzanines above the street floor.

(c) In stores protected throughout by an approved automatic sprinkler system in accordance with Section 7-7, openings may be unprotected under the conditions permitted by 6-2.2.3.4 or between the street floor and the floor below the street floor and between the street floor and the second floor or, if no openings to the floor below the street floor, between the street floor, street floor balcony or mezzanine, and second floor, but not between more than three floor levels.

(d) One floor above those otherwise permitted may be open if such floor is not used for sales purposes and the entire building is sprinklered.

Exception No. 2: As permitted in Class B stores where:

(a) Openings may be unprotected between any two floors, such as open stairs or escalators between the street floor and the floor below, or between the street floor and mezzanine or second floor.

(b) All floors permitted under Class B may have unprotected openings if the building is protected throughout by an approved automatic sprinkler system in accordance with Section 7-7.

Exception No. 3: As permitted in Class C stores where:

(a) In any store, openings may be unprotected between the street floor and balcony.

(b) Openings may be unprotected between the street floor and the floor below or the second floor if not used for sales purposes.

Exception No. 4: Atriums in accordance with 25-4.4 are permitted.

25-3.2 Protection from Hazards.

25-3.2.1 An area used for general storage, boiler or furnace rooms, fuel storage, janitor closets, maintenance shops including woodworking and painting areas, and kitchens shall be separated from other parts of the building by construction having a fire resistance rating of not less than 1 hour, and all openings shall be protected with self-closing fire doors.

Exception: Areas protected by an automatic extinguishing system.

25-3.2.2 Isolated hazardous areas may be protected in accordance with 7-7.1.2.

25-3.2.3 Areas with high hazard contents as defined in Section 4-2 shall be provided with both fire-resistive separation and automatic sprinkler protection.

25-3.3 Interior Finish.

25-3.3.1 Interior finish on walls and ceilings shall be Class A or B, in accordance with Section 6-5.

Exception No. 1: Existing Class C interior finish shall be permitted as follows:

(a) On walls.

(b) Throughout Class C stores.

Exception No. 2: In any mercantile occupancy, exposed portions of structural members complying with the requirements for heavy timber construction may be permitted. Laminated wood shall not delaminate under the influence of heat.

25-3.3.2 Interior Floor Finish. No Requirements.

25-3.4 Detection, Alarm and Communications Systems.

25-3.4.1 General. Class A mercantile occupancies shall be provided with a fire alarm system in accordance with Section 7-6.

25-3.4.2 Initiation. Initiation of the required fire alarm system shall be by manual means per 7-6.2.1(a).

Exception No. 1: Initiation may be by means of an approved automatic fire detection system in accordance with 7-6.2.1(b), providing protection throughout the building.

Exception No. 2: Initiation may be by means of an approved automatic sprinkler system, in accordance with 7-6.2.1(c), providing protection throughout the building.

25-3.4.3 Notification.

25-3.4.3.1 At all times that the store is occupied (*see 5-2.1.1.3*) the required fire alarm system shall:

(a) Sound a general audible alarm throughout the store, or

(b) Sound an audible alarm in a continuously attended location for purposes of initiating emergency action.

25-3.4.3.2 Occupant Notification. Occupant notification shall be by live voice public address system announcement originating from the attended location where the alarm signal is received (*see 25-3.4.3.1*). The system may be used for other announcements (*see 7-6.3.9 Exception No. 2*).

Exception: Any other occupant notification means permitted by 7-6.3 may be used in lieu of live voice public address system announcement.

25-3.5 Extinguishment Requirements.

25-3.5.1 Mercantile occupancies shall be protected throughout by an approved automatic sprinkler system in accordance with Section 7-7 as follows:

(a) In all buildings with a story over 15,000 sq ft (1400 sq m) in area.

(b) In all buildings exceeding 30,000 sq ft (2800 sq m) in gross area.

(c) Throughout stories below the level of exit discharge when such stories have an area exceeding 2,500 sq ft (230 sq m) when used for the sale, storage, or handling of combustible goods and merchandise.

Exception: Single-story buildings which meet the requirements of a street floor.

25-3.5.2 Portable fire extinguishers shall be provided in all mercantile occupancies in accordance with 7-7.4.1.

25-3.6 Corridors. No Special Requirements.

25-3.7 Subdivision of Building Spaces. No Special Requirements.

25-3.8 Special Features.

SECTION 25-4 SPECIAL PROVISIONS

25-4.1 Windowless or Underground Buildings. (*See Section 30-7.*)

25-4.2 Open-Air Mercantile Operations.

25-4.2.1 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 so arranged and conducted as to maintain free and unobstructed ways of travel at all times to permit 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.

25-4.2.2 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 shall not be construed to constitute buildings for the purpose of this *Code.*

25-4.3 Covered Malls.

25-4.3.1 The covered mall and all buildings connected thereto shall be treated as a single building for the purposes of calculation of means of egress and shall be subject to the requirements for appropriate occupancies. The covered mall shall be at least of sufficient clear width to accommodate egress requirements as set forth in other sections of this *Code.*

Exception: The covered mall may be considered to be a pedestrian way, in which case the distance of travel within a tenant space to an exit or to the covered mall shall be a maximum of 150 ft (45 m) (see Exception to 25-2.6), or shall be the maximum for the appropriate occupancy; plus 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 at least of sufficient clear width to accommodate egress requirements as set forth in other sections of this chapter, but in no case less than 20 ft (6.1 m) wide in its narrowest dimension.

(b) The covered mall shall be provided with an unobstructed exit access on each side of the mall floor area 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 minimum of three units of exit width. (See 25-4.3.2.)*

(c) The covered mall and all buildings connected thereto shall be protected throughout by an approved electrically supervised automatic sprinkler system in accordance with Section 7-7.

(d) Walls dividing stores from each other shall extend from the floor to the underside of the roof deck or floor deck above. No separation is required between a tenant space and the covered mall.

(e) The covered mall shall be provided with a smoke control system.*

25-4.3.2 Exit Details.

25-4.3.2.1 Every floor of a covered mall shall have no less than two exits located remote from each other.

25-4.3.2.2 No less than one-half the required exit widths for each Class A or Class B store connected to a covered mall shall lead directly outside without passage through the mall.

25-4.3.2.3* Each individual anchor store shall have means of egress independent of the covered mall.

25-4.3.2.4 Every covered mall shall be provided with unobstructed exit access, parallel to and adjacent to the connected buildings. This exit access shall extend to each mall exit.

25-4.3.3 Detection, Alarm and Communications Systems.

25-4.3.3.1 General. Covered malls shall be provided with a fire alarm system in accordance with Section 7-6.

25-4.3.3.2 Initiation. Initiation of the required fire alarm system shall be by the approved automatic sprinkler system in accordance with 7-6.2.1(c).

25-4.3.3.3 Notification. At all times that the store is occupied (*see 5-2.1.1.3*) the required fire alarm system shall:

(a) Sound a general audible alarm throughout the store, or

(b) Sound an audible alarm in a continuously attended location for purposes of initiating emergency action.

25-4.3.3.4 Occupant Notification. Occupant notification shall be by live voice public address system announcement originating from the attended location where the alarm signal is received (*see 25-4.3.3.3*). The system may be used for other announcements (*see 7-6.3.9 Exception No. 2*).

Exception: Any other occupant notification means permitted by 7-6.3 may be used in lieu of live voice public address system announcement.

25-4.3.3.5 Emergency Forces Notification. Emergency forces notification shall include notifying:

(a) The fire department in accordance with 7-6.4, and

(b) The local fire brigade, if provided, via the attended location where the alarm signal is received (*see 25-4.3.3.3*).

25-4.3.3.6 Emergency Control. The fire alarm system shall be arranged to automatically actuate smoke management or smoke control systems in accordance with 7-6.5.2(d).

25-4.4 Atriums.

25-4.4.1 Atriums are permitted provided they comply with 6-2.2.3.5 and 25-4.4.2 through 25-4.4.6.

25-4.4.2 The occupancy within the atrium meets the specifications for classification as low hazard contents. (*See 4-2.2.2.*)

25-4.4.3 The automatic sprinkler system required by 6-2.2.3.5(e) shall be electrically supervised.

25-4.4.4 The atrium is provided with an automatic ventilation system operated by all of the following:

(a) Approved smoke detectors located at the top of the space and adjacent to each return air intake from the atrium, and

(b) The required automatic fire extinguishing system, and

(c) Manual controls which are readily accessible to the fire department.

25-4.4.5 Detection, Alarm and Communications Systems.

25-4.4.5.1 General. Buildings housing atriums shall be provided with a fire alarm system in accordance with Section 7-6.

25-4.4.5.2 Initiation. Initiation of the required fire alarm system shall be by both:

(a) Activation of the smoke detection system [*see 7-6.2.1(b)*], and

(b) Activation of the automatic sprinkler system [*see 7-6.2.1(c)*].

Manual pull stations are not required.

25-4.4.5.3 Notification. At all times that the store is occupied (*see 5-2.1.1.3*) the required fire alarm system shall:

(a) Sound a general audible alarm throughout the store, or

(b) Sound an audible alarm in a continuously attended location for purposes of initiating emergency action.

25-4.4.5.4 Occupant Notification. Occupant notification shall be by live voice public address system announcement originating from the attended location where the alarm signal is received (*see 25-4.4.5.3*). The system may be used for other announcements (*see 7-6.3.9 Exception No. 2*).

Exception: Any other occupant notification means permitted by 7-6.3 may be used in lieu of live voice public address system announcement.

25-4.4.5.5 Emergency Forces Notification. Emergency forces notification shall include notifying:

(a) The fire department in accordance with 7-6.4, and

(b) The local fire brigade, if provided.

25-4.4.5.6 Emergency Control. The fire alarm system shall be arranged to automatically actuate smoke management or smoke control systems in accordance with 7-6.5.2(d).

25-4.4.6 All electrical equipment essential for smoke control or automatic extinguishing equipment for buildings more than six stories or 75 ft (23 m) in height containing an atrium shall be provided with an emergency source of power in accordance with NFPA 70, *National Electrical Code*, Section 700-12(b), or equivalent.

25-4.5 Operating Features. (*See Chapter 31.*)

SECTION 25-5 BUILDING SERVICES

25-5.1 Utilities shall comply with the provisions of Section 7-1.

25-5.2 Heating, ventilating, and air conditioning equipment shall comply with the provisions of Section 7-2.

25-5.3 Elevators, dumbwaiters and vertical conveyors shall comply with the provisions of Section 7-4.

25-5.4 Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 7-5.

CHAPTER 26 NEW BUSINESS OCCUPANCIES

(See also Chapter 31.)

SECTION 26-1 GENERAL REQUIREMENTS

26-1.1 Application.

26-1.1.1 New construction shall comply with the provisions of this chapter. *(See Chapter 31 for operating features.)*

26-1.1.2 This section establishes life safety requirements for the design of all new business buildings. Specific requirements for high-rise buildings [buildings over 75 ft (23 m) in height] are contained in paragraphs pertaining thereto.

26-1.1.3 Additions to existing buildings shall conform to the requirements for new constructon. Existing portions of the structure need not be modified, provided that the new construction has not diminished the fire safety features of the facility.

26-1.2 Mixed Occupancies.

26-1.2.1 Combined Business and Mercantile Occupancy.

26-1.2.1.1 In any building occupied for both business and mercantile purposes, the entire building shall have exits in accordance with 1-4.7.

Exception: If mercantile occupancy sections are effectively segregated from business sections, exit facilities may be treated separately.

26-1.3 Special Definitions. None.

26-1.4 Classification of Occupancy.

26-1.4.1 Business occupancies shall include all buildings and structures or parts thereof with occupancy described in 4-1.8.

26-1.5 Classification of Hazard of Contents.

26-1.5.1 The contents of business occupancies shall be classified as ordinary hazard in accordance with Section 4-2.

26-1.5.2 For purposes of the design of an automatic sprinkler system, a business occupancy shall be classified as "light hazard occupancy," as identified by NFPA 13, *Standard for the Installation of Sprinkler Systems.*

26-1.6 Minimum Construction Requirements. No Requirements.

26-1.7 Occupant Load.

26-1.7.1 For purposes of determining required exits, the occupant load of business buildings or parts of buildings used for business purposes shall be no less than one person per 100 sq ft (9.3 sq m) of gross floor area.

26-1.7.2 In the case of a mezzanine or balcony open to the floor below or other unprotected vertical openings between floors as permitted by 26-3.1, the occupant load of the mezzanine or other subsidiary floor level shall be added to that of the street floor for the purpose of determining required exits. However, in no case shall the total number of exit units be less than would be required if all vertical openings were enclosed.

SECTION 26-2 MEANS OF EGRESS REQUIREMENTS

26-2.1 General.

26-2.1.1 All means of egress shall be in accordance with Chapter 5 and this chapter.

26-2.1.2 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.

26-2.1.3* Where a stair or ramp serves two or more upper floors, the same stair or other exit required to serve any one upper floor may also serve other upper floors.

Exception: No inside open stairway or ramp may serve as a required egress facility from more than one floor.

26-2.1.4 Where two or more floors below the street floor are occupied for business use, the same stairs or ramps may serve each.

Exception: No inside open stairway or ramp may serve as a required egress facility from more than one floor level.

26-2.1.5 Floor levels below the street floor used only for storage, heating, and other service equipment, and not subject to business occupancy, shall have exits in accordance with Chapter 29.

26-2.2 Types of Exits.

26-2.2.1 Exits shall be restricted to the following permissible types:

(a) *Doors (see 5-2.1).*
(b) *Stairs (see 5-2.2).*
(c) *Smokeproof enclosures (see 5-2.3).*
(d) *Horizontal exits (see 5-2.4).*
(e) *Ramps (see 5-2.5).*
(f) *Exit passageways (see 5-2.6).*
(g) *Revolving doors (see 5-2.1.10).*

26-2.3 Capacity of Means of Egress.

26-2.3.1 The capacity of means of egress shall be in accordance with Section 5-3.

26-2.3.2 The minimum width of any corridor or passageway shall be 44 in. (112 cm) in the clear.

26-2.3.3 Street floor exits shall be sufficient for the occupant load of the street floor plus the capacity of stairs and ramps discharging through the street floor.

26-2.4 Number of Exits. Not less than two exits shall be accessible from every part of every floor, including floor levels below the street floor occupied for business purposes or uses incidental thereto.

Exception No. 1: For a room or area with a total occupant load of less than 100 persons (or less than 50 if an assembly occupancy — see Chapter 8), having direct exit to the street or to an open area outside the building at the ground level, with a total distance from any point of not over 100 ft (30 m), a single exit may be permitted. Such travel shall be on the same floor level or, if the traversing of stairs is required, such stairs shall not be more than 15 ft (4.5 m) in height, and they shall be

provided with complete enclosures to separate them from any other part of the building, with no door openings therein.

Exception No. 2: Any business occupancy not over three stories and not exceeding an occupant load of 30 people per floor may be permitted with a single separate exit to each floor if the total travel distance to the outside of the building does not exceed 100 ft (30 m) and if such exit is enclosed in accordance with 5-1.3 and serves no other levels and discharges directly to the outside. A single outside stairway in accordance with 5-2.2 may serve all floors.

26-2.5 Arrangement of Means of Egress.

26-2.5.1* Exits shall be arranged in accordance with Section 5-5.

26-2.5.2 No dead-end corridor shall exceed 20 ft (6.1 m).

Exception: In buildings protected throughout by an approved supervised automatic sprinkler system, dead-end corridors shall not exceed 50 ft (15 m).

26-2.5.3 No common path of travel shall exceed 50 ft (15 m).

Exception No. 1: A common path of travel may be permitted for the first 75 ft (23 m) in a building protected throughout by an approved supervised automatic sprinkler system in accordance with Section 7-7.

Exception No. 2: A single tenant space which does not exceed an occupant load of 30 people may have a single exit access from that tenant space provided the corridor to which that exit access leads does not exceed a 20 ft (6.1 m) dead end.

26-2.6* Travel Distance to Exits. Travel distance to exits, measured in accordance with Section 5-6, shall be no more than 200 ft (60 m).

Exception: An increase in the above travel distance to 300 ft (91 m) shall be permitted in a building protected throughout by an approved automatic sprinkler system in accordance with Section 7-7.

26-2.7 Discharge from Exits.

26-2.7.1 At least half of the required number of units of exit width from upper floors, exclusive of horizontal exits, shall lead directly to the street or through a yard, court, or passageway with protected openings and separated from all parts of the interior of the building.

26-2.7.2 A maximum of 50 percent of the exits may discharge through the level of exit discharge in accordance with 5-7.2.

26-2.8 Illumination of Means of Egress. Means of egress illumination shall be provided in accordance with Section 5-8.

26-2.9 Emergency Lighting.

26-2.9.1 Emergency lighting in accordance with Section 5-9 shall be required in any business occupancy building where:

(a) The building is two or more stories in height above the level of exit discharge, or

(b) The occupancy is subject to 100 or more occupants above or below the level of exit discharge, or

(c) The occupancy is subject to 1,000 or more total occupants.

26-2.9.2 Emergency lighting in accordance with Section 5-9 shall be provided for all windowless or underground structures meeting the definition of 30-1.3.

26-2.10 Marking of Means of Egress. Signs designating exits and ways of travel thereto shall be provided in accordance with Section 5-10.

26-2.11 Special Features.

26-2.11.1* Locks in accordance with Exception No. 2 of 5-2.1.5.1 shall be permitted only on principal entrance/exit doors.

26-2.11.2 Selected doors on stairwells may be equipped with hardware that prevents reentry in accordance with 5-2.1.5.2 Exception No. 1.

26-2.11.3 Special locking arrangements in accordance with 5-2.1.6 are permitted.

26-2.11.4 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 be in accordance with the provisions of 5-2.1.4.1 Exception No. 3.

26-2.11.5 Spiral stairs in accordance with 5-2.2.2.4 are permitted.

SECTION 26-3 PROTECTION

26-3.1 Protection of Vertical Openings.

26-3.1.1 Every stairway, elevator shaft, escalator opening, and other vertical opening shall be enclosed or protected in accordance with Section 6-2.

Exception No. 1: Unprotected vertical openings connecting not more than three floors used for business occupancy only may be permitted in accordance with the conditions of 6-2.2.3.4.

Exception 2: A vertical opening enclosure will not be required for a vertical opening where:

(a) The vertical opening connects only two adjacent floors, neither of which is a basement, and

(b) The vertical opening is not a required means of egress, and

(c) The vertical opening is not connected with corridors or other stairways, and

(d) The building is protected throughout by an approved automatic sprinkler system in accordance with Section 7-7, or the connected floors are protected throughout by an approved automatic smoke detection system installed in accordance with Section 7-6.

Exception No. 3: Atriums in accordance with 26-4.3 are permitted.

26-3.1.2 Floors below the street floor used for storage or other than business occupancy shall have no unprotected openings to business occupancy floors.

26-3.2 Protection from Hazards.

26-3.2.1 Any area used for general storage, boiler or furnace rooms, fuel storage, janitor closets, maintenance shops including woodworking and painting areas, and kitchens shall be separated from other parts of the building by construction having a fire resistance rating of not less than 1 hour, and all openings shall be protected with self-closing fire doors.

Exception: Areas protected by an automatic extinguishing system.

26-3.2.2 Isolated hazardous areas may be protected in accordance with 7-7.1.2.

26-3.2.3 High hazard content areas, as defined in Section 4-2, shall be protected by both fire resistance rated construction and automatic extinguishing equipment.

26-3.3 Interior Finish.

26-3.3.1 Interior finish on walls and ceilings of exits and of enclosed corridors furnishing access thereto or ways of travel therefrom shall be Class A or Class B in accordance with Section 6-5.

26-3.3.2 In office areas, Class A, Class B, or Class C interior finish shall be provided in accordance with Section 6-5.

26-3.3.3 Interior floor finish in corridors and exits shall be Class I or Class II in accordance with Section 6-5.

26-3.4 Detection, Alarm and Communications Systems.

26-3.4.1 General. A fire alarm system in accordance with Section 7-6 shall be provided in any business occupancy where:

(a) The building is two or more stories in height above the level of exit discharge, or

(b) The occupancy is subject to 100 or more occupants above or below the level of exit discharge, or

(c) The occupancy is subject to 1,000 or more total occupants.

26-3.4.2 Initiation. Initiation of the required fire alarm system shall be by manual means per 7-6.2.1(a).

Exception No. 1: Initiation may be by means of an approved automatic fire detection system, in accordance with 7-6.2.1(b), providing protection throughout the building.

Exception No. 2: Initiation may be by means of an approved automatic sprinkler system, in accordance with 7-6.2.1(c), providing protection throughout the building.

26-3.4.3 Notification.

26-3.4.3.1 At all times that the building is occupied (*see 5-2.1.1.3*) the required fire alarm system shall:

(a) Sound a general audible alarm throughout the building, or

(b) Sound an audible alarm in a continuously attended location for purposes of initiating emergency action.

26-3.4.3.2 Occupant Notification. Occupant notification shall be by live voice public address system announcement originating from the attended location where the alarm signal is received (*see 26-3.4.3.1*). The system may be used for other announcements (*see 7-6.3.9 Exception No. 2*).

Exception: Any other occupant notification means permitted by 7-6.3 may be used in lieu of live voice public address system announcement.

26-3.5 Extinguishment Systems. Portable fire extinguishers shall be provided in every business occupancy in accordance with 7-7.4.1. (*See also Section 26-4.*)

26-3.6 Corridors.

26-3.6.1 Where access to exits is limited to corridors, such corridors shall be separated from use areas by partitions having a fire resistance rating of at least 1 hour.

Exception No. 1: Where exits are available from an open floor area.*

Exception No. 2: Corridors need not have a fire resistance rating within a space occupied by a single tenant.*

Exception No. 3: Corridors need not have a fire resistance rating within buildings protected throughout by an approved automatic sprinkler system.

26-3.6.2 Doors and frames, each with a minimum 20-minute fire protection rating, equipped with a positive latch and closing device, shall be used to protect openings in 1-hour partitions separating the corridor from use areas.

26-3.6.3 Glass vision panels within 1-hour fire-rated partitions, or doors therein, shall be limited to fixed wired glass in approved steel frames and shall be 1,296 sq in. (.84 sq m) or less in size per panel.

SECTION 26-4 SPECIAL PROVISIONS

26-4.1 Windowless or Underground Buildings. (*See Section 30-7.*)

26-4.2* High-Rise Buildings.

26-4.2.1 All business occupancy buildings over 75 ft (23 m) in height shall be protected throughout by an approved automatic sprinkler system, fully electrically supervised and designed in accordance with Section 7-7, or shall be designed with a system that will provide equivalent life safety as permitted by the provisions of Section 1-5. Building height shall be measured from the lowest level of fire department access to the floor of the highest occupiable story.

26-4.2.2 In addition to the above requirements, all buildings regardless of height shall comply with all other applicable provisions of this chapter.

26-4.3 Atriums.

26-4.3.1 Atriums are permitted provided they comply with 6-2.2.3.5 and 26-4.3.2 through 26-4.3.6.

26-4.3.2 The occupancy within the atrium meets the specifications for classification as low hazard contents. (*See 4-2.2.2.*)

26-4.3.3 The automatic sprinkler system required by 6-2.2.3.5(e) shall be electrically supervised.

26-4.3.4 The atrium is provided with an automatic ventilation system operated by all of the following:

(a) Approved smoke detectors located at the top of the space and adjacent to each return air intake from the atrium, and

(b) The required automatic fire extinguishing system, and

(c) Manual controls which are readily accessible to the fire department.

26-4.3.5 Detection, Alarm and Communications Systems.

26-4.3.5.1 General. Buildings housing atriums shall be provided with a fire alarm system in accordance with Section 7-6.

26-4.3.5.2 Initiation. Initiation of the required fire alarm system shall be by both:

(a) Activation of the smoke detection system [*see 7-6.2.1(b)*], and

(b) Activation of the automatic sprinkler system [*see 7-6.2.1(c)*].

Manual pull stations are not required.

26-4.3.5.3 Notification. At all times that the building is occupied (*see 5-2.1.1.3*) the required fire alarm system shall:

(a) Sound a general audible alarm throughout the building, or

(b) Sound an audible alarm in a continuously attended location for purposes of initiating emergency action.

26-4.3.5.4 Occupant Notification. Occupant notification shall be by live voice public address system announcement originating from the attended location where the alarm signal is received (*see 26-4.3.5.3*). The system may be used for other announcements (*see 7-6.3.9 Exception No. 2*).

Exception: Any other occupant notification means permitted by 7-6.3 may be used in lieu of live voice public address system announcement.

26-4.3.5.5 Emergency Forces Notification. Emergency forces notification shall include notifying:

(a) The fire department in accordance with 7-6.4, and

(b) The local fire brigade, if provided.

26-4.3.5.6 Emergency Control. The fire alarm system shall be arranged to automatically actuate smoke management or smoke control systems in accordance with 7-6.5.2(d).

26-4.3.6 All electrical equipment essential for smoke control or automatic extinguishing equipment for buildings more than six stories or 75 ft (23 m) in height containing an atrium shall be provided with an emergency source of power in accordance with NFPA 70, *National Electrical Code*, Section 700-12(b), or equivalent.

26-4.4 Operating Features. (*See Chapter 31.*)

SECTION 26-5 BUILDING SERVICES

26-5.1 Utilities shall comply with the provisions of Section 7-1.

26-5.2 Heating, ventilating and air conditioning equipment shall comply with the provisions of Section 7-2.

26-5.3 Elevators, dumbwaiters and vertical conveyors shall comply with the provisions of Section 7-4.

26-5.4 Rubbish chutes, incinerators and laundry chutes shall comply with the provisions of Section 7-5.

CHAPTER 27 EXISTING BUSINESS OCCUPANCIES

(See also Chapter 31.)

SECTION 27-1 GENERAL REQUIREMENTS

27-1.1 Application.

27-1.1.1 Existing business occupancies shall comply with the provisions of this chapter. (*See Chapter 31 for operating features.*)

27-1.1.2 This chapter establishes life safety requirements for existing buildings. Specific requirements for high-rise buildings [buildings over 75 ft (23 m) in height] are contained in paragraphs pertaining thereto.

27-1.2 Mixed Occupancies.

27-1.2.1 Combined Business and Mercantile Occupancy.

27-1.2.1.1 In any building occupied for both business and mercantile purposes, the entire building shall have exits in accordance with 1-4.7.

Exception: If mercantile occupancy sections are effectively segregated from business sections, exit facilities may be treated separately.

27-1.3 Special Definitions. None.

27-1.4 Classification of Occupancy.

27-1.4.1 Business occupancies shall include all buildings and structures or parts thereof with occupancy described in 4-1.8.

27-1.5 Classification of Hazard of Contents.

27-1.5.1 The contents of business occupancies shall be classified as ordinary hazard in accordance with Section 4-2.

27-1.5.2 For purposes of the design of an automatic sprinkler system, a business occupancy shall be classified as "light hazard occupancy," as identified by NFPA 13, *Standard for the Installation of Sprinkler Systems.*

27-1.6 Minimum Construction Requirements. No Requirements.

27-1.7 Occupant Load.

27-1.7.1 For purposes of determining required exits, the occupant load of business buildings or parts of buildings used for business purposes shall be no less than one person per 100 sq ft (9.3 sq m) of gross floor area.

27-1.7.2 In the case of a mezzanine or balcony open to the floor below or other unprotected vertical openings between floors as permitted by 27-3.1, the occupant load of the mezzanine or other subsidiary floor level shall be added to that of the street floor for the purpose of determining required exits. However, in no case shall the total number of exit units be less than would be required if all vertical openings were enclosed.

SECTION 27-2 MEANS OF EGRESS REQUIREMENTS

27-2.1 General.

27-2.1.1 All means of egress shall be in accordance with Chapter 5 and this chapter.

27-2.1.2 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.

27-2.1.3* Where a stair, escalator, or ramp serves two or more upper floors, the same stair or other exit required to serve any one upper floor may also serve other upper floors.

Exception: No inside open stairway, escalator, or ramp may serve as a required egress facility from more than one floor.

27-2.1.4 Where two or more floors below the street floor are occupied for business use, the same stairs, escalators or ramps may serve each.

Exception: No inside open stairway, escalator or ramp may serve as a required egress facility from more than one floor level.

27-2.1.5 Floor levels below the street floor used only for storage, heating, and other service equipment, and not subject to business occupancy, shall have exits in accordance with Chapter 29.

27-2.2 Types of Exits.

27-2.2.1 Exits shall be restricted to the following permissible types:

(a) *Doors (see 5-2.1).*
(b) *Stairs, Class A or B (see 5-2.2).*
(c) *Smokeproof enclosures (see 5-2.3).*
(d) *Horizontal exits (see 5-2.4).*
(e) *Ramps (see 5-2.5).*
(f) *Exit passageways (see 5-2.6).*
(g) *Escalators (see 5-2.7).*
(h) *Revolving doors (see 5-2.1.10).*
(i) *Fire escape stairs (see 5-2.8).*

27-2.3 Capacity of Means of Egress.

27-2.3.1 The capacity of means of egress shall be in accordance with Section 5-3.

27-2.3.2 The minimum width of any corridor or passageway shall be 44 in. (112 cm) in the clear.

27-2.3.3 Street floor exits shall be sufficient for the occupant load of the street floor and the capacity of stairs, ramps, escalators and moving walks discharging through the street floor.

27-2.4 Number of Exits. Not less than two exits shall be accessible from every part of every floor, including floor levels below the street floor occupied for business purposes or uses incidental thereto.

Exception No. 1: For a room or area with a total occupant load of less than 100 persons (or less than 50 if an assembly occupancy — see Chapter 9), having direct exit to the street or to an open area outside the building at the ground level, with a total travel distance from any point of not over 100 ft (30 m), a single exit may be permitted. Such travel shall be on the same floor level or, if the traversing of stairs is required, such stairs shall not be more than 15 ft (4.5 m) in height, and they shall be provided with complete enclosures to separate them from any other part of the building, with no door openings therein.

Exception No. 2: Any business occupancy not over three stories and not exceeding an occupant load of 30 people per floor may be permitted with a single separate exit to each floor if the total travel distance to the outside of the building does not exceed 100 ft (30 m) and if such exit is enclosed in accordance with 5-1.3 and serves no other levels and discharges directly to the outside. A single outside stairway in accordance with 5-2.2 may serve all floors.

27-2.5 Arrangement of Means of Egress.

27-2.5.1* Exits shall be arranged in accordance with Section 5-5.

27-2.5.2 No dead-end corridor shall exceed 50 ft (15 m).

Exception: Existing dead-end corridors exceeding 50 ft (15 m) may be continued in use subject to the approval of the authority having jurisdiction and the travel distance requirements of 27-2.6.*

27-2.5.3 No common path of travel shall exceed 50 ft (15 m).

Exception No. 1: A common path of travel may be permitted for the first 100 ft (30 m) on a story protected throughout by an approved automatic sprinkler system in accordance with Section 7-7 or for the first 75 ft (23 m) on stories protected throughout by a complete approved supervised automatic smoke detection system which, upon activation, sounds an alarm on that floor.

Exception No. 2: A single tenant space which does not exceed an occupant load of 30 people may have a single exit access, provided the corridor to which that exit access leads does not have a dead end in excess of 50 ft (15 m).

Exception No. 3: Existing excessive common paths of travel may be continued in use subject to the approval of the authority having jurisdiction and the travel distance requirements of 27-2.6.*

27-2.6* Travel Distance to Exits. Travel distance to exits, measured in accordance with Section 5-6, shall be no more than 200 ft (60 m).

Exception: An increase in the above travel distance to 300 ft (91 m) shall be permitted in a building protected throughout by an approved automatic sprinkler system in accordance with Section 7-7.

27-2.7 Discharge from Exits.

27-2.7.1 At least half of the required number of units of exit width from upper floors, exclusive of horizontal exits, shall lead directly to the street or through a yard, court, or passageway with protected openings and separated from all parts of the interior of the building.

27-2.7.2 A maximum of 50 percent of the exits may discharge through the level of exit discharge in accordance with 5-7.2.

27-2.8 Illumination of Means of Egress. Means of egress illumination shall be provided in accordance with Section 5-8.

27-2.9 Emergency Lighting.

27-2.9.1 Emergency lighting in accordance with Section 5-9 shall be required in any business occupancy building where:

(a) The building is two or more stories in height above the level of exit discharge, or

(b) The occupancy is subject to 100 or more occupants above or below the level of exit discharge, or

(c) The occupancy is subject to 1,000 or more total occupants.

27-2.9.2 Emergency lighting in accordance with Section 5-9 shall be provided for all windowless or underground structures meeting the definition of 30-1.3.

27-2.10 Marking of Means of Egress. Signs designating exits and ways of travel thereto shall be provided in accordance with Section 5-10.

27-2.11 Special Features.

27-2.11.1* Locks in accordance with Exception No. 2 of 5-2.1.5.1 shall be permitted only on principal entrance/exit doors.

27-2.11.2 The reentry provisions of 5-2.1.5.2 need not be met (*see 5-2.1.5.2 Exception No. 3*).

27-2.11.3 Special locking arrangements in accordance with 5-2.1.6 are permitted.

27-2.11.4 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 be used in accordance with the provisions of 5-2.1.4.1 Exception No. 3.

27-2.11.5 Spiral stairs in accordance with 5-2.2.2.4 are permitted.

27-2.11.6 Winders in stairs in accordance with 5-2.2.2.5 are permitted.

SECTION 27-3 PROTECTION

27-3.1 Protection of Vertical Openings.

27-3.1.1 Every stairway, elevator shaft, escalator opening, and other vertical opening shall be enclosed or protected in accordance with Section 6-2.

Exception No. 1: Unprotected vertical openings connecting not more than three floors used for business occupancy only may be permitted in accordance with the conditions of 6-2.2.3.4.

Exception No. 2: A vertical opening enclosure will not be required for a vertical opening where:

(a) The vertical opening connects only two adjacent floors, neither of which is a basement, and

(b) The vertical opening is not a required means of egress, and

(c) The vertical opening is not connected with corridors or other stairways, and

(d) The building is protected throughout by an approved automatic sprinkler system in accordance with Section 7-7, or the connected floors are protected throughout by an approved automatic smoke detection system installed in accordance with Section 7-6.

Exception No. 3: Atriums in accordance with 27-4.3 are permitted.

Exception No. 4: In buildings protected throughout by an approved automatic sprinkler system in accordance with Section 7-7, vertical openings may be unprotected if no unprotected vertical opening serves as any part of any required exit facility and all required exits consist of smokeproof enclosures in accordance with 5-2.3, outside stairs in accordance with 5-2.2, or horizontal exits in accordance with 5-2.4.

27-3.1.2 Floors below the street floor used for storage or other than business occupancy shall have no unprotected openings to business occupancy floors.

27-3.2 Protection from Hazards.

27-3.2.1 Any area used for general storage, boiler or furnace rooms, fuel storage, janitor closets, maintenance shops including woodworking and painting areas, and kitchens shall be separated from other parts of the building by construction having a fire resistance rating of not less than 1 hour, and all openings shall be protected with self-closing fire doors.

Exception: Areas protected by an automatic extinguishing system.

27-3.2.2 Isolated hazardous areas may be protected in accordance with 7-7.1.2.

27-3.2.3 High hazard content areas, as defined in Section 4-2, shall be protected by both fire resistance rated construction and automatic extinguishing equipment.

27-3.3 Interior Finish.

27-3.3.1 Interior finish on walls and ceilings of exits and of enclosed corridors furnishing access thereto or ways of travel therefrom shall be Class A or Class B in accordance with Section 6-5.

27-3.3.2 In office areas, Class A, Class B, or Class C interior finish shall be provided in accordance with Section 6-5.

27-3.3.3 Interior Floor Finish. No Requirements.

27-3.4 Detection, Alarm and Communications Systems.

27-3.4.1 General. A fire alarm system in accordance with Section 7-6 shall be provided in any business occupancy where:

(a) The building is two or more stories in height above the level of exit discharge, or

(b) The occupancy is subject to 100 or more occupants above or below the level of exit discharge, or

(c) The occupancy is subject to 1,000 or more total occupants.

27-3.4.2 Initiation. Initiation of the required fire alarm system shall be by manual means per 7-6.2.1(a).

Exception No. 1: Initiation may be by means of an approved automatic fire detection system, in accordance with 7-6.2.1(b), providing protection throughout the building.

Exception No. 2: Initiation may be by means of an approved automatic sprinkler system, in accordance with 7-6.2.1(c), providing protection throughout the building.

27-3.4.3 Notification.

27-3.4.3.1 At all times that the building is occupied (*see 5-2.1.1.3*) the required fire alarm system shall:

(a) Sound a general audible alarm throughout the building, or

(b) Sound an audible alarm in a continuously attended location for purposes of initiating emergency action.

27-3.4.3.2 Occupant Notification. Occupant notification shall be by live voice public address system announcement originating from the attended location where the alarm signal is received (*see 27-3.4.3.1*). The system may be used for other announcements (*see 7-6.3.9 Exception No. 2*).

Exception: Any other occupant notification means permitted by 7-6.3 may be used in lieu of live voice public address system announcement.

27-3.5 Extinguishment Requirements. Portable fire extinguishers shall be provided in every business occupancy in accordance with 7-7.4.1. (*See also Section 27-4.*)

SECTION 27-4 SPECIAL PROVISIONS

27-4.1 Windowless or Underground Buildings. (*See Section 30-7.*)

27-4.2 High-Rise Buildings.

27-4.2.1 All business occupancy buildings over 75 ft (23 m) in height shall be provided wth a reasonable degree of safety from fire which shall be accomplished by the installation of a complete approved automatic sprinkler system designed in accordance with Section 7-7 or an engineered life safety system approved by the authority having jurisdicion which may consist of a combination of any or all of the following systems:

Partial automatic sprinkler protection,
Smoke detection alarms,
Smoke control,
Compartmentation,
and/or other approved systems.

Building height shall be measured from the lowest level of fire department access to the floor of the highest occupiable story.

27-4.2.2* A limited but reasonable time shall be allowed for compliance with any part of this section, commensurate with the magnitude of expenditure and the disruption of services.

27-4.2.3 In addition to the above requirements, all buildings regardless of height shall comply with all other applicable provisions of this chapter.

27-4.3 Atriums.

27-4.3.1 Atriums are permitted provided they comply with 6-2.2.3.5 and 27-4.3.2 through 27-4.3.3.

27-4.3.2 The occupancy within the atrium meets the specifications for classification as low hazard contents. (*See 4-2.2.2.*)

27-4.3.3 The automatic sprinkler system required by 6-2.2.3.5(e) shall be electrically supervised.

27-4.3.4 The atrium is provided with an automatic ventilation system operated by all of the following:

(a) Approved smoke detectors located at the top of the space and adjacent to each return air intake from the atrium, and

(b) The required automatic fire extinguishing system, and

(c) Manual controls which are readily accessible to the fire department.

27-4.3.5 Detection, Alarm and Communications Systems.

27-4.3.5.1 General. Buildings housing atriums shall be provided with a fire alarm system in accordance with Section 7-6.

27-4.3.5.2 Initiation. Initiation of the required fire alarm system shall be by both:

(a) Activation of the smoke detection system [*see 7-6.2.1(b)*], and

(b) Activation of the automatic sprinkler system [*see 7-6.2.1(c)*].

Manual pull stations are not required.

27-4.3.5.3 Notification. At all times that the building is occupied (*see 5-2.1.1.3*) the required fire alarm system shall:

(a) Sound a general audible alarm throughout the building, or

(b) Sound an audible alarm in a continuously attended location for purposes of initiating emergency action.

27-4.3.5.4 Occupant Notification. Occupant notification shall be by live voice public address system announcement originating from the attended location where the alarm signal is received (*see 27-4.3.5.3*). The system may be used for other announcements (*see 7-6.3.9 Exception No. 2*).

Exception: Any other occupant notification means permitted by 7-6.3 may be used in lieu of live voice public address system announcement.

27-4.3.5.5 Emergency Forces Notification. Emergency forces notification shall include notifying:

(a) The fire department in accordance with 7-6.4, and

(b) The local fire brigade, if provided.

27-4.3.5.6 Emergency Control. The fire alarm system shall be arranged to automatically actuate smoke management or smoke control systems in accordance with 7-6.5.2(d).

27-4.3.6 All electrical equipment essential for smoke control or automatic extinguishing equipment for buildings more than six stories or 75 ft (23 m) in height containing an atrium shall be provided with an emergency source of power in accordance with NFPA 70, *National Electrical Code*, Section 700-12(b), or equivalent.

27-4.4 Operating Features. (*See Chapter 31.*)

SECTION 27-5 BUILDING SERVICES

27-5.1 Utilities shall comply with the provisions of Section 7-1.

27-5.2 Heating, ventilating, and air conditioning equipment shall comply with the provisions of Section 7-2.

27-5.3 Elevators, dumbwaiters and vertical conveyors shall comply with the provisions of Section 7-4.

27-5.4 Rubbish chutes, incinerators and laundry chutes shall comply with the provisions of Section 7-5.

CHAPTER 28
INDUSTRIAL OCCUPANCIES

(See also Chapter 31.)

SECTION 28-1 GENERAL REQUIREMENTS

28-1.1 Application. The requirements of this chapter apply to both new and existing Industrial Occupancies. Industrial occupancies 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.

28-1.2 Mixed Occupancies. In any building occupied for both industrial and other purposes, exits shall comply with 1-4.7.

28-1.3 Special Definitions. None.

28-1.4 Classification of Occupancy. *(See 4-1.9, and for open industrial structures, see Chapter 30.)*

28-1.4.1 General Industrial Occupancy. Ordinary and low hazard manufacturing operations, conducted in buildings of conventional design suitable for various types of manufacture. Included are multistory buildings where floors are rented to different tenants or buildings suitable for such occupancy and, therefore, subject to possible use for types of manufacturing with a high density of employee population.

28-1.4.2 Special Purpose Industrial Occupancy. Includes ordinary and low hazard manufacturing operations 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.

28-1.4.3* High Hazard Industrial Occupancy. Includes those buildings having high hazard materials, processes or contents. Incidental high hazard operations in low or ordinary occupancies and protected in accordance with Section 4-2 and 28-3.2 shall not be the basis for overall occupancy classification.

28-1.5 Classification of hazard of contents shall be as defined in Section 4-2.

28-1.6 Minimum Construction Standards. No occupancy requirement.

28-1.7* Occupant Load. The occupant load of industrial occupancies for determination of means of egress shall be one person per 100 sq ft (9.3 sq m) of gross floor area.

Exception: In a special purpose industrial occupancy, the occupant load shall be the maximum number of persons to occupy the area under any probable conditions.

SECTION 28-2 MEANS OF EGRESS REQUIREMENTS

28-2.1 General.

28-2.1.1 Each required means of egress shall be in accordance with the applicable portions of Chapter 5.

28-2.2 Types of Exits. Exits shall be restricted to the following permissible types:

(a) *Doors (see 5-2.1).*

(b) *Stairs (see 5-2.2).* In existing buildings Class A or B.

(c) *Smokeproof enclosures (see 5-2.3).*

(d) *Horizontal exits (see 5-2.4).*

(e) *Ramps (see 5-2.5).*

(f) *Exit passageways (see 5-2.6).*

(g) *Existing fire escape stairs (see 5-2.8).*

(h) *Fire escape ladders (see 5-2.9).*

Exception No. 1: In existing buildings, previously approved escalators and moving walks may be continued in use, in accordance with 5-2.7.

Exception No. 2: Approved slide escapes (see 5-2.10) may be used as required exits for both new and existing high hazard industrial occupancies. Slide escapes shall be counted as exits only when regularly used in drills or for normal exit so that occupants are, through practice, familiar with their use.

Exception No. 3: In horizontal exits where the doorway is protected by a fire door on each side of the wall in which it occurs, one fire door shall be of the swinging type as provided in 5-2.4.3.3, and the other may be an automatic sliding fire door that shall be kept open whenever the building is occupied.*

28-2.3 Capacity of Means of Egress.

28-2.3.1 The capacity of means of egress shall be in accordance with Section 5-3.

Exception: In special purpose industrial occupancies, means of egress shall be provided at least for the persons actually employed; spaces not subject to human occupancy because of the presence of machinery or equipment may be excluded from consideration.

28-2.3.2* The minimum width of any corridor or passageway serving as a required exit, exit access, or exit discharge shall be 44 in. (112 cm) in the clear.

28-2.4 Number of Exits.

28-2.4.1 No less than two exits shall be provided for every story or section, including stories below the floor of exit discharge used for general industrial purposes or for uses incidental thereto.

Exception: For rooms or areas with a total capacity of less than 25 persons having a direct exit to the street or to an open area outside the building at ground level, with a total travel distance from any point of not over 50 ft (15 m), a single exit may be permitted. Such travel shall be on the same floor level or, if the traversing of stairs is required, there shall be a vertical travel of no more than 15 ft (4.5 m) and such stairs shall be provided with complete enclosures to separate them from any other part of the building, with no door openings therein. This Exception shall not apply to high hazard industrial occupancies.

28-2.4.2 There shall be at least two separate means of egress from every high hazard area regardless of size.

28-2.5 Arrangement of Means of Egress.

28-2.5.1* Where two or more exits are required, they shall be so arranged as to be reached by different paths of travel in different directions.

Exception: A common path of travel may be permitted for the first 50 ft (15 m) from any point in low and ordinary hazard occupancies.

28-2.5.2 No dead end may be more than 50 ft (15 m) deep. Dead ends are not permitted in high hazard occupancies.

28-2.6 Travel Distance to Exits.

28-2.6.1 Travel to exits shall not exceed 100 ft (30 m) from any point to reach the nearest exit.

Exception No. 1: In a building protected throughout by an approved automatic sprinkler system in accordance with Section 7-7, travel distance may be increased to 150 ft (45 m).

Exception No. 2: As permitted by 28-2.6.2.

Exception No. 3: Travel distance to exits in high hazard industrial occupancies shall not exceed 75 ft (23 m).

28-2.6.2 In a building used for low or ordinary hazard, general industrial occupancies or special purpose industrial occupancies requiring undivided floor areas necessitating travel distances exceeding 150 ft (45 m), distance to exits shall be satisfied by providing stairs leading to exit tunnels, overhead passageways or through horizontal exits through firewalls, arranged in accordance with Chapter 5. Where such arrangements are not practicable, the authority having jurisdiction may, by special ruling, permit travel distances up to 400 ft (122 m) to the nearest exit. Distances shall be based on meeting the following additional provisions in full:

(a) Shall limit application to one-story buildings only.

(b) Shall limit interior finish to Class A or B (*see Section 6-5*).

(c) Shall provide emergency lighting (*see Section 5-9 and 28-2.9*).

(d) Shall provide automatic sprinkler or other automatic fire extinguishing systems in accordance with Section 7-7. The extinguishing system shall be supervised.

(e)* Shall provide smoke and heat venting by engineered means or by building configuration to ensure that occupants shall not be overtaken by spread of fire or smoke within 6 ft (183 cm) of floor level before they have time to reach exits.

28-2.7* Discharge from Exits. A maximum of 50 percent of the exits may discharge through areas on the level of discharge arranged in accordance with 5-7.2.

28-2.8 Illumination of Means of Egress.

28-2.8.1 Illumination of means of egress shall be provided in accordance with Section 5-8.

Exception: Means of egress illumination may be eliminated in structures occupied only in daylight hours with skylights or windows arranged to provide, during these hours, the required level of illumination on all portions of the means of egress.

28-2.9 Emergency Lighting.

28-2.9.1 All industrial occupancies shall have emergency lighting in accordance with Section 5-9.

Exception No. 1: Special purpose industrial occupancies do not require emergency lighting when routine human habitation is not the case.

Exception No. 2: Emergency lighting may be eliminated in structures occupied only in daylight hours with skylights or windows arranged to provide, during those hours, the required level of illumination on all portions of the means of egress.

28-2.10 Exit Marking.

28-2.10.1 Signs designating exits or ways of travel thereto shall be provided in accordance with Section 5-10.

28-2.11 Special Features.

28-2.11.1 Special locking arrangements in accordance with 5-2.1.6 are permitted on exterior doors.

28-2.11.2 Spiral stairs in accordance with 5-2.2.2.4 are permitted.

28-2.11.3 In existing buildings winders in accordance with 5-2.2.2.5 are permitted.

SECTION 28-3 PROTECTION

28-3.1 Protection of Vertical Openings.

28-3.1.1 Every stairway, elevator shaft, escalator opening, and other vertical opening shall be enclosed or protected in accordance with Chapter 5 and Section 6-2.

Exception No. 1: Unprotected vertical openings connecting not more than three floors may be permitted in accordance with the conditions of 6-2.2.3.4.

Exception No. 2: An atrium may be utilized in accordance with 6-2.2.3.5.

Exception No. 3: In special purpose and high hazard occupancies where unprotected vertical openings are in new or existing buildings and necessary to manufacturing operations, they may be permitted beyond the specified limits, provided every floor level has direct access to one or more enclosed stairways or other exits protected against obstruction by any fire or smoke in the open areas connected by the unprotected vertical openings.

Exception No. 4: Existing open stairways, existing open ramps and existing escalators may be unenclosed or unprotected when connecting only two floor levels.

Exception No. 5: In existing buildings with low or ordinary hazard contents and protected throughout by an approved automatic sprinkler system in accordance with Section 7-7, vertical openings may be unprotected providing the vertical opening does not serve as a required exit. All required exits under such conditions shall consist of smokeproof enclosures in accordance with 5-2.3, outside stairs in accordance with 5-2.2, or horizontal exits in accordance with 5-2.4.

28-3.2* Protection from Hazards. Every high hazard industrial occupancy, operation, or process shall have automatic extinguishing systems or such other protection as may be appropriate to the particular hazard, such as explosion venting or suppression, for any area subject to an explosion hazard, designed to minimize danger to occupants in case of fire or other emergency before they have time to utilize exits to escape.

28-3.3 Interior Finish.

28-3.3.1 Interior finish on walls and ceilings shall be Class A,

B or C in accordance with Section 6-5, in operating areas, and shall be as required by 5-1.4 in exit enclosures.

28-3.3.2 Interior Floor Finish. No occupancy requirements.

28-3.4 Detection, Alarm and Communications Systems.

28-3.4.1 General. Industrial occupancies shall be provided with a fire alarm system in accordance with Section 7-6.

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.

28-3.4.2 Initiation. Initiation of the required fire alarm system shall be by either manual or automatic means in accordance with 7-6.2.

28-3.4.3 Notification.

28-3.4.3.1 The required fire alarm system shall sound an audible alarm in a continuously attended location for purposes of initiating emergency action.

28-3.4.3.2 In high hazard industrial occupancies (*see 28-1.4*) the required fire alarm system shall automatically initiate an occupant evacuation alarm signal per 7-6.3.

SECTION 28-4 SPECIAL PROVISIONS

28-4.1 Operating Features. (*See Chapter 31.*)

CHAPTER 29 STORAGE OCCUPANCIES

(See also Chapter 31.)

SECTION 29-1 GENERAL REQUIREMENTS

29-1.1 Application. The requirements of this chapter apply to both new and existing storage occupancies. Storage occupancies include all buildings or structures used primarily for the storage or sheltering of goods, merchandise, products, vehicles or animals.

29-1.2 Mixed Occupancies. *(See 1-4.7 and 29-1.4.)*

29-1.3 Special Definitions. None.

29-1.4 Classification of Occupancy. Storage occupancies shall include all occupancies defined in 4-1.10. Incidental storage in another occupancy shall not be the basis for overall occupancy classification.

Exception: Storage occupancies or areas of storage occupancies which 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 28).

29-1.5* Classification of Hazard of Contents. Contents of storage occupancies shall be classified as high hazard, ordinary hazard, or low hazard in accordance with Section 4-2, depending upon the character of the materials stored, their packaging, and other factors.

29-1.6 Minimum Construction Standards. No occupancy requirements.

29-1.7 Occupant Load. No Requirements.

SECTION 29-2 MEANS OF EGRESS REQUIREMENTS

29-2.1 General. Every required means of egress shall be in accordance with the applicable portions of Chapter 5.

29-2.2 Types of Exits. Exits shall be restricted to the following permissible types:

(a) *Doors (see 5-2.1).*

(b) *Stairs (see 5-2.2.).* In existing buildings Class A or B.

(c) *Smokeproof enclosures (see 5-2.3).*

(d) *Horizontal exits (see 5-2.4).*

(e) *Ramps (see 5-2.5).*

(f) *Exit passageways (see 5-2.6).*

(g) *Existing fire escape stairs (see 5-2.8).*

(h) *Fire escape ladders (see 5-2.9).*

(i) *Existing slide escapes (see 5-2.10).*

Exception: In horizontal exits where the doorway is protected by a fire door on each side of the wall in which it occurs, one fire door shall be of the swinging type as provided in 5-2.4.3.3, and the other may be an automatic sliding fire door that shall be kept open whenever the building is occupied.*

29-2.3 Capacity of Means of Egress.

29-2.3.1 The capacity of a means of egress shall be in accordance with Section 5-3.

29-2.3.2 The minimum width of any corridor or passageway serving as a required exit or means of travel to or from a required exit shall be 44 in. (112 cm) in the clear.

29-2.4 Number of Exits.

29-2.4.1 Every building or structure used for storage and every section thereof considered separately shall have at least two separate means of egress, as remote from each other as practicable.

Exception: One means of egress may be provided from rooms or enclosures within storage buildings, structures or sections of a storage building not exceeding 10,000 sq ft (930 sq m) and not occupied normally by more than ten persons, and not containing high hazard material. Travel distance in that means of egress in an unsprinklered building shall not exceed 50 ft (15 m) and 100 ft (30 m) in a building protected throughout by an approved automatic sprinkler system.

29-2.5 Arrangement of Means of Egress.

29-2.5.1 Travel from all locations in a storage occupancy of high hazard contents shall be via at least two separate routes to exits remote from each other.

29-2.5.2 No dead ends are permitted in high hazard occupancies.

29-2.6 Travel Distance to Exits.

29-2.6.1* Travel to exits shall not exceed 200 ft (60 m) from any point to reach the nearest exit.

Exception No. 1: In a building protected throughout by an approved automatic sprinkler system in accordance with Section 7-7, travel distance may be increased to 400 ft (122 m).

Exception No. 2: There shall be no limitations on travel to exits for low hazard storage occupancy.

Exception No. 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 may be present. Travel distance shall be measured in accordance with 5-6.2.

Exception No. 4: In areas used for the storage of high hazard commodities and protected throughout by an approved automatic sprinkler system in accordance with Section 7-7, distances to an exit shall be within 100 ft (30 m) of any point in the area where persons may be present.

29-2.7 Discharge from Exits. A maximum of 50 percent of the exits may discharge through areas on the level of discharge arranged in accordance with 5-7.2.

29-2.8 Illumination of Means of Egress.

29-2.8.1 Illumination of means of egress shall be provided in accordance with Section 5-8.

Exception: In structures occupied only in daylight hours with windows arranged to provide, during daylight hours, the required level of illumination of all portions of the means of egress may be eliminated by special permission of the authority having jurisdiction.

29-2.9 Emergency Lighting.

29-2.9.1 All storage occupancies shall have emergency lighting in accordance with Section 5-9.

Exception No. 1: Storage occupancies do not require emergency lighting when not normally occupied.

Exception No. 2: In structures occupied only in daylight hours with skylights or windows arranged to provide, during these hours, the required level of illumination on all portions of the means of egress, emergency lighting may be eliminated.

29-2.10 Exit Marking. Signs designating exits or ways of travel thereto shall be provided in accordance with Section 5-10.

29-2.11 Special Features.

29-2.11.1 Special locking arrangements in accordance with 5-2.1.6 are permitted on exterior doors.

29-2.11.2 Spiral stairs in accordance with 5-2.2.2.4 are permitted.

29-2.11.3 In existing buildings winders in accordance with 5-2.2.2.5 are permitted.

SECTION 29-3 PROTECTION

29-3.1 Protection of Vertical Openings.

29-3.1.1 Every stairway, elevator shaft, escalator opening, manlift opening and other vertical opening shall be enclosed or protected in accordance with Section 6-2.

Exception No. 1: Unprotected vertical openings connecting not more than three floors may be permitted in accordance with the conditions of 6-2.2.3.4.

Exception No. 2: An atrium may be utilized in accordance with 6-2.2.3.5.

Exception No. 3: In existing buildings with low or ordinary hazard contents and protected throughout by an approved automatic sprinkler system in accordance with Section 7-7, vertical openings may be unprotected when they do not serve as required exits. All required exits under such conditions shall consist of smokeproof enclosures in accordance with 5-2.3, outside stairs in accordance with 5-2.2, or horizontal exits in accordance with 5-2.4.

29-3.2 Protection from Hazards. No occupancy requirements.

29-3.3 Interior Finish.

29-3.3.1 Interior finish on walls and ceilings shall be Class A, B, or C in accordance with Section 6-5 in the storage areas and shall be as required by 5-1.4 in exit enclosures.

29-3.3.2 Interior Floor Finish. No occupancy requirements.

29-3.4 Detection, Alarm and Communications Systems.

29-3.4.1 General. Storage occupancies shall be provided with a fire alarm system in accordance with Section 7-6.

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 sq ft (9,300 sq m).

Exception No. 3: Storage occupancies with complete automatic extinguishment protection.

29-3.4.2 Initiation. Initiation of the required fire alarm system shall be by either manual or automatic means in accordance with 7-6.2.

29-3.4.3 Notification. The required fire alarm system shall sound an audible alarm in a continuously attended location for purposes of initiating emergency action.

SECTION 29-4 SPECIAL PROVISIONS

29-4.1 Operating Features. (*See Chapter 31.*)

SECTION 29-5 BUILDING SERVICES (RESERVED)

SECTION 29-6* SPECIAL PROVISIONS FOR AIRCRAFT HANGARS

29-6.1 The requirements of Sections 29-1, 29-2 and 29-3 shall be met, except as modified by 29-6.2 through 29-6.4.

29-6.2 Exits from aircraft storage or servicing areas shall be provided at intervals of not more than 150 ft (45 m) on all exterior walls. There shall be a minimum of two exits serving each aircraft storage or servicing area. Horizontal exits through interior fire walls shall be provided at intervals of not more than 100 ft (30 m) along the wall.

Exception: Dwarf or "smash" doors in doors accommodating aircraft may be used to comply with these requirements.

29-6.3 Exits from mezzanine floors in aircraft storage or servicing areas shall be so arranged that the maximum travel to reach the nearest exit from any point on the mezzanine shall not exceed 75 ft (23 m). Such exits shall lead directly to a properly enclosed stairwell discharging directly to the exterior, to a suitable cutoff area, or to outside stairs.

29-6.4 No dead end may be more than 50 ft (15 m) deep.

Exception: No dead end shall be allowed for high hazard areas.

SECTION 29-7* SPECIAL PROVISIONS FOR GRAIN OR OTHER BULK STORAGE ELEVATORS

29-7.1 The requirements of Sections 29-1, 29-2 and 29-3 shall be met, except as modified in 29-7.2 through 29-7.4.

29-7.2 There shall be at least 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 which is enclosed by a dust-resistant 1-hour fire resistance rated enclosure in accordance with 5-1.3. The second means of egress may be either:

(a) An exterior stair or basket ladder-type fire escape accessible from all working levels of the head house which provides a passage to ground level, or

(b) An exterior stair or basket ladder-type fire escape accessible from all working levels of the head house which provides access to the top of adjoining structures which provide a continuous path to the means of egress described in 29-7.3.

Exception: Stair enclosures in existing structures may have non-fire-rated dust-resistant enclosures.

29-7.3 There shall be an exterior stair or basket ladder-type fire escape which provides passage to ground level from the top of the end of the adjoining structures such as silos, conveyors, galleries, gantries, etc.

29-7.4 Underground Spaces.

29-7.4.1 Underground spaces shall have at least two means of egress, one of which may be a means of escape. The means of escape shall be arranged to eliminate dead ends.

29-7.4.2 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 automatic sprinkler system in accordance with Section 7-7, travel distance may be increased to 400 ft (122 m).

SECTION 29-8 SPECIAL PROVISIONS FOR PARKING GARAGES

29-8.1 General Requirements.

29-8.1.1* Application. The following provisions apply to parking garages of closed or open type, above or below ground, but not to mechanical or exclusively attendant parking facilities, which are not occupied by customers and thus require a minimum of exits.

29-8.1.2 Mixed Occupancies.

29-8.1.2.1 Where both parking and repair operations are conducted in the same building, the entire building shall comply with Chapter 28.

Exception: If the parking and repair sections are separated by 1-hour fire-rated construction, the parking and repair sections may be treated separately.

29-8.1.2.2 In areas where repair operations are conducted, the exits shall comply with Chapter 28, Industrial Occupancies.

29-8.1.3 Special Definitions.

Open Air Parking Structure. Buildings, structures, or portions thereof, used for parking motor vehicles and having not less than 25 percent of the total wall area open to atmosphere at each level, utilizing at least two sides of the structure.

29-8.1.4 Classification of Occupancy. Incidental vehicle parking in another occupancy shall not be the basis for overall occupancy classification.

29-8.1.5 Classification of Hazard of Contents. Garages used only for the storage of vehicles shall be classified as ordinary hazard in accordance with Section 4-2.

29-8.1.6 Minimum Construction Requirements. No Special Requirements.

29-8.1.7 Occupant Load. No Requirements.

29-8.2 Means of Egress Requirements.

29-8.2.1 General. Required means of egress shall be in accordance with the applicable portions of Chapter 5.

29-8.2.2 Types of Exits. Exits shall be restricted to the following permissible types:

(a) Doors, in accordance with 5-2.1.

(b) Stairs, in accordance with 5-2.2.

(c) Smokeproof enclosures, in accordance with 5-2.3.

(d) Horizontal exits, in accordance with 5-2.4.

(e) Ramps, in accordance with 5-2.5, not subject to normal vehicular traffic.

(f) Exit passageways, in accordance with 5-2.6.

(g) Fire escape stairs for existing garages only, in accordance with 5-2.8.

Exception No. 1: In a ramp-type open garage with open vehicle ramps not subject to closure, the ramp may serve in lieu of the second exit from floors above the level of exit discharge, providing the ramp discharges directly outside of the street level.

Exception No. 2: For garages extending only one floor level below the level of exit discharge a vehicle ramp leading directly to the outside may serve in lieu of the second exit, provided no door or shutter is installed therein.

Exception No. 3: An opening for the passage of automobiles may serve as an exit from a street floor, provided no door or shutter is installed therein.

29-8.2.3 Capacity of Means of Egress. (*Also see 29-8.2.4, Number of Exits, and 29-8.2.5, Arrangement of Means of Egress.*)

29-8.2.3.1 The minimum width of any corridor or passageway serving as a required exit or means of travel to or from a required exit shall be 44 in. (112 cm) in the clear.

29-8.2.4 Number of Exits. Every floor of every garage shall have access to at least two separate exits.

29-8.2.5 Arrangement of Means of Egress.

29-8.2.5.1 Exits shall be so arranged that from any point in the garage the paths of travel to the two exits will be in different directions.

Exception: A common path of travel may be permitted for the first 50 ft (15 m) from any point.

29-8.2.5.2 No dead end may be more than 50 ft (15 m) deep.

29-8.2.5.3* If any gasoline pumps are located within any closed parking garage, exits shall be arranged and located to meet the following:

(a) Travel away from the gasoline pump in any direction will lead to an exit, with no dead end in which occupants might be trapped by fire or explosion at any gasoline pump.

(b) Such exit shall lead to the outside of the building on the same level, or stairs; no upward travel shall be permitted unless direct outside exits are available from that floor.

(c) Any story below that story at which gasoline is being dispensed shall have exits direct to outside via outside stairs or doors at ground level.

29-8.2.6 Travel Distance to Exits. Exits in garages shall be so arranged that no point in the area will be more than 150 ft (45 m) (measured in accordance with 5-6.2) from the nearest complying permissible exit.

Exception No. 1: Travel distance may be increased to 200 ft (60 m) for open floors of unsprinklered, open air garages and 300 ft (91 m) in open air garages protected throughout by an approved automatic sprinkler system.

Exception No. 2: Travel distance may be increased to 200 ft (60 m) for enclosed parking garages protected throughout by an approved automatic sprinkler system in accordance with Section 7-7.

Exception No. 3: For new garages with vehicle ramps serving in lieu of the second exit per 29-8.2.2 Exception No. 1, travel distance shall be measured to the exit discharge.

Exception No. 4: For existing garages with vehicle ramps serving in lieu of the second exit per 29-8.2.2 Exception No. 1, no travel distance requirements apply.

29-8.2.7 Discharge from Exits. No special occupancy provisions.

29-8.2.8 Illumination of Means of Egress. Every public space, hall, stair enclosure, and other means of egress shall have illumination in accordance with Section 5-8.

Exception: In structures occupied only in daylight hours with windows arranged to provide, during daylight hours, the required level of illumination of all portions of the means of egress illumination may be eliminated by special permission of the authority having jurisdiction.

29-8.2.9 Emergency Lighting. Every public space, hall, stair enclosure, and other means of egress shall have emergency lighting in accordance with Section 5-9.

Exception: In structures occupied only in daylight hours with skylights or windows arranged to provide, during these hours, the required level of illumination on all portions of the means of egress, emergency lighting may be eliminated.

29-8.2.10 Exit Marking. Signs designating exits or ways of travel thereto shall be provided in accordance with Section 5-10.

29-8.2.11 Special Features.

29-8.2.11.1 Special locking arrangements in accordance with 5-2.1.6 are permitted on exterior doors.

29-8.2.11.2 In existing buidings, winders in accordance with 5-2.2.2.5 are permitted.

29-8.3 Protection.

29-8.3.1 Protection of Vertical Openings. No Requirements.

29-8.3.2 Protection from Hazards. No Requirements (*see 29-8.1.2.1*).

29-8.3.3 Interior Finish.

29-8.3.3.1 Interior Wall and Ceiling Finish. Interior finish on walls and ceilings shall be Class A, B, or C, in accordance with Section 6-5 in garages, and shall be as required by 5-1.4 in exit enclosures.

29-8.3.3.2 Interior Floor Finish. No Requirements.

29-8.3.4 Detection, Alarm and Communications Systems.

29-8.3.4.1 General. Garages exceeding an aggregate floor area of 100,000 sq ft (9,300 sq m) shall be provided with a fire alarm system in accordance with Section 7-6.

Exception No. 1: Open air parking structures.

Exception No. 2: Garages protected throughout with an approved automatic sprinkler system in accordance with Section 7-7.

29-8.3.4.2 Initiation. Initiation of the required fire alarm system shall be by either manual or automatic means in accordance with 7-6.2.

29-8.3.4.3 Notification. The required fire alarm system shall sound an audible alarm in a continuously attended location for purposes of initiating emergency action.

CHAPTER 30 OCCUPANCIES IN UNUSUAL STRUCTURES

(See also Chapter 31.)

SECTION 30-1 GENERAL REQUIREMENTS

30-1.1 Application. The requirements of this chapter apply to both new and existing occupancies in unusual structures. Unusual structures are those buildings or structures occupied for purposes not regulated by Chapters 8 through 29.

Exception: Any building, tower or vessel surrounded by water and under the jurisdiction of the US Coast Guard, such as a lighthouse, offshore oil platform or vessel mooring point, and designed and arranged in accordance with Coast Guard regulations is exempt from the requirements of this chapter.

30-1.2 Mixed Occupancies. *(See 1-4.7.)*

30-1.3 Special Definitions.

30-1.3.1 Tower. Independent structure or portion of a building occupied for observation, signaling or similar limited use and not open to general use.

30-1.3.2 Vehicle. Any house trailer, railroad car, street car, bus or similar conveyance no longer mobile and permanently fixed to a foundation.

30-1.3.3 Vessel. Any ship, barge or other vessel, permanently fixed to a foundation or mooring or unable to get under way under its own power and occupied for purposes other than navigation.

30-1.3.4* Underground Structure. A structure or portions of a structure in which the story is below the level of exit discharge.

Exception: A structure or portions of a structure shall not be considered an underground structure if:

(a) The story is provided on at least two sides with at least 20 sq ft (1.9 sq m) of opening entirely above the adjoining grade level in each 50 lineal ft (15 m) of exterior enclosing wall area, and

(b) The openings have a minimum dimension of not less than 22 in. (55.9 cm) in width and 24 in. (60 cm) in height that are unobstructed to allow for ventilation and rescue operations from the exterior, and

(c) The bottom of the openings are not be more than 44 in. (112 cm) above the floor, and

(d) The openings are readily identifiable from both the exterior and interior of the story, and

(e) The openings are readily openable from both the exterior and interior of the story.

30-1.3.5 Windowless Structure. A structure or portions of a structure lacking means for direct access to the outside from the enclosing walls, or outside openings for ventilation or rescue through windows.

Exception No. 1: A one-story structure or portion thereof shall not be considered a windowless structure if:

(a) The story is provided with grade level doors, access panels or windows, on two sides of the building, spaced not more than 125 ft (38 m) apart in the exterior walls, and

(b) The access panels or windows have a minimum dimension of not less than 22 in. (55.9 cm) in width and 24 in. (60 cm) in height that are unobstructed to allow for ventilation and rescue operations, and

(c) The bottom of the openings are not more than 44 in. (112 cm) above the floor, and

(d) The openings are readily identifiable from both the exterior and interior of the story, and

(e) The openings are readily openable from both the exterior and interior of the story.

Exception No. 2: A structure or portion thereof more than one story in height shall not be considered a windowless structure if:

(a) Access openings are provided for the first story as required in Exception No. 1 above, and

(b) Every story above the first floor is provided with access openings or windows on two sides of the building, spaced not more than 30 ft (9.1 m) apart, and

(c) The openings have a minimum dimension of not less than 22 in. (55.9 cm) in width and 42 in. (107 cm) in height that are unobstructed to allow for ventilation and rescue operations, and

(d) The bottoms of the openings are not more than 44 in. (112 cm) above the floor, and

(e) The openings are readily identifiable from both the exterior and interior of the story, and

(f) The openings are readily openable from both the exterior and interior of the story.

30-1.3.6 Water Surrounded Structure. A structure fully surrounded by water.

30-1.3.7 Open Structure. Operations and equipment conducted in open air and not enclosed within buildings, such as found in oil refining and chemical processing plants. Roofs or canopies providing shelter without enclosing walls may be provided and shall not be considered an enclosure.

30-1.4 Classification of Occupancy. Occupancies in unusual structures meeting the purposes regulated by Chapters 8 through 29 shall meet the requirements of those chapters in addition to the requirements of Chapter 30.

30-1.5 Classification of hazard of contents shall be as defined in Section 4-2.

30-1.6 Minimum Construction Standard. No special occupancy provisions.

30-1.7 Occupant Load. The occupant load of unusual structures shall be as determined by the maximum actual design occupant load.

Exception: Any unusual structure or part of an unusual structure utilized for an occupancy regulated by Chapters 8 through 29, in which case the requirements of the appropriate chapter shall apply.

SECTION 30-2 MEANS OF EGRESS REQUIREMENTS

30-2.1 General. Each required means of egress shall be in accordance with the applicable portions of Chapter 5.

30-2.2* Types of Exits. Exits shall be restricted to the following permissible types:

(a) *Doors (see 5-2.1).*

(b) *Stairs (see 5-2.2).* In existing structures, Class A or B.

(c) *Smokeproof enclosures (see 5-2.3).*

(d) *Horizontal exits (see 5-2.4).*

(e) *Ramps (see 5-2.5).*

(f) *Exit passageways (see 5-2.6).*

(g) *Existing fire escape stairs (see 5-2.8).*

(h) *Ladders (see 5-2.9).*

Exception No. 1: In existing buildings, previously approved escalators and moving walks may be continued in use, in accordance with 5-2.7.

Exception No. 2: Towers and open structures, such as a forest fire observation or railroad signal tower designed for occupancy by not more than three persons employed therein may be served by ladder instead of stairs.

30-2.3 Capacity of Means of Egress.

30-2.3.1 The width and capacity of a means of egress shall be in accordance with Chapter 5.

Exception No. 1: The means of egress for towers shall be provided for the persons expected to occupy the space.

Exception No. 2: Open structures.

Exception No. 3: Spaces not subject to human occupancy because of machinery or equipment may be excluded from consideration.

30-2.3.2 The minimum width of any corridor or passageway serving as a required exit, or means of travel to or from a required exit, shall be 44 in. (112 cm) in the clear.

Exception: Where ladders are permitted by 30-2.2.

30-2.3.3 Required means of egress for multistoried unusual structures may serve other floors than the level where required. However, an interior egress facility shall serve only one floor for purposes of designing means of egress.

Exception No. 1: No inside open stairway, escalator or ramp may serve as a required egress facility from more than one floor level.

Exception No. 2: Open structures.

30-2.4 Number of Exits. No less than two exits shall be provided for every story or section, including stories below the floor of exit discharge.

Exception No. 1: Piers used exclusively to moor cargo vessels and to store materials where provided with proper exit facilities from structures thereon to the pier and a single means of access to the mainland as appropriate with the pier's arrangement.

Exception No. 2: The grade level of open structures which by their very nature contain an infinite number of exits.

Exception No. 3: Towers may be provided with single exits if the following conditions are met:*

(a) The tower is subject to less than twenty-five persons on any one floor level.

(b) The tower is not used for living or sleeping purposes and is subject to occupancy by only able-bodied persons.

(c) The tower is of Type I, II or IV construction.

(d) The tower interior finish is Class A or B.

(e) The tower has no combustible materials in, under, or in the immediate vicinity, except necessary furniture.

(f) There are no high hazard occupancies in the tower or immediate vicinity.

Exception No. 4: Open structures occupied by not more than three people with travel distance to exit not more than 200 ft (60 m).

30-2.5 Arrangement of Means of Egress.

30-2.5.1 Where two or more exits are required, they shall be arranged so as to be reached by different paths of travel in different directions.

Exception: A common path of travel may be permitted for the first 50 ft (15 m) from any point.

30-2.5.2 No dead end may be more than 50 ft (15 m) deep.

30-2.5.3* Piers.

30-2.5.3.1 Piers not meeting requirements of 30-2.4, Exception No. 1, and occupied for other than cargo handling and storage shall have exits arranged in accordance with Chapters 8 through 29. (*See 30-1.4.*) 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 may block escape of occupants to shore.

30-2.5.3.2 The pier shall be arranged to provide two separate ways of travel to shore as by two well-separated walkways or independent structures.

30-2.5.3.3 The pier deck shall be open and fire resistive on noncombustible supports.

30-2.5.3.4 The pier shall be open and unobstructed and is 50 ft (15 m) or more in width if less than 500 ft (150 m) long, or its width is not less than ten percent of its length if over 500 ft (150 m) long.

30-2.5.3.5 The pier deck shall be provided with automatic sprinkler protection for combustible substructure and all superstructures, if any.

30-2.6 Travel Distance to Exits. Travel to exits, when not regulated by Chapters 8 through 29, shall not exceed 100 ft (30 m).

Exception No. 1: In a building or structure protected throughout by an approved automatic sprinkler system in accordance with Section 7-7, travel distance may be increased to 150 ft (45 m).

Exception No. 2: Where ladders are permitted in 30-2.2 Exception No. 2.

Exception No. 3: Open structures.

30-2.7 Discharge from Exits. A maximum of fifty percent of the exits may discharge through areas on the level of discharge arranged in accordance with 5-7.2.

Exception: Towers or other structures provided with one exit, as permitted by 30-2.4 and arranged in accordance with 30-2.5, may have 100 percent of the exit discharge through areas on the level of discharge.

30-2.8 Illumination of Means of Egress. Illumination of means of egress shall be provided in accordance with Section 5-8.

Exception No. 1: Open structures.

Exception No. 2: Towers with ladders for exits as permitted by 30-2.2 Exception No. 2.

30-2.9 Emergency Lighting. Emergency lighting shall be provided in accordance with Section 5-9.

Exception No. 1: Open structures.

Exception No. 2: Towers with ladders for exits as permitted by 30-2.2 Exception No. 2.

Exception No. 3: Locations not routinely inhabited by humans.

Exception No. 4: Structures occupied only in daylight hours with windows arranged to provide, during daylight hours, the required level of illumination on all portions of the means of egress, upon special approval of the authority having jurisdiction.

30-2.10 Exit Marking. Signs designating exits or ways of travel thereto shall be provided in accordance with Section 5-10.

Exception No. 1: Towers with ladders for exits as permitted by 30-2.2.

Exception No. 2: Open structures.

Exception No. 3: Locations where routine human habitation is not provided.

30-2.11 Special Features.

30-2.11.1 Spiral stairs in accordance with 5-2.2.2.4 are permitted.

30-2.11.2 In existing buildings, winders in accordance with 5-2.2.2.5 are permitted.

SECTION 30-3 PROTECTION

30-3.1 Protection of Vertical Openings. Every stairway, elevator shaft, escalator opening, and other vertical opening shall be enclosed or protected in accordance with Chapter 5 and Section 6-2.

Exception No. 1: In towers where there is no occupancy below the top floor level, stairs may be open with no enclosure required or fire escape stairs may be used when the structure is entirely open.

Exception No. 2: Towers with ladders for exits as permitted by 30-2.2 Exception No. 2.

Exception No. 3: Open structures.

30-3.2 Protection from Hazards. Every unusual structure shall have automatic, manual or such other protection as may be appropriate to the particular hazard designed to minimize danger to occupants in case of fire or other emergency before they have time to utilize exits to escape.

Exception: Unusual structures, such as open structures, with only occasional occupancy.

30-3.3 Interior Finish.

30-3.3.1 Interior finish on walls and ceilings shall be Class A, B or C, in accordance with Section 6-5, and as required by 5-1.4 in exit enclosures.

30-3.3.2 Interior Floor Finish. No special occupancy requirements.

30-3.4 Detection, Alarm and Communications Systems.

30-3.4.1 General. A fire alarm system shall be provided in accordance with Section 7-6.

Exception No. 1: Towers designed for occupancy by not more than three persons.

Exception No. 2: Open structures.

30-3.4.2 Initiation. Initiation of the required fire alarm system shall be by either manual or automatic means in accordance with 7-6.2.

30-3.4.3 Notification. The required fire alarm system shall sound an audible alarm in a continuously attended location for purposes of initiating emergency action.

SECTION 30-4 SPECIAL PROVISIONS

30-4.1 Operating Features. (*See Chapter 31.*)

SECTION 30-5 BUILDING SERVICES (RESERVED)

SECTION 30-6* SPECIAL PROVISIONS FOR VEHICLES AND VESSELS

30-6.1 Any vehicle which is subject to human occupancy and is prevented from being mobile shall comply with the appropriate requirements of this *Code* which are appropriate to buildings of similar occupancy. (*See 30-1.4.*)

30-6.2 Any ship, barge or other vessel, permanently fixed to a foundation or mooring or unable to get under way under its own power and occupied for purposes other than navigation, shall be subject to the requirements of this *Code* applicable to buildings of similar occupancy.

SECTION 30-7 SPECIAL PROVISIONS FOR UNDERGROUND STRUCTURES AND WINDOWLESS BUILDINGS

30-7.1 General.

30-7.1.1 In addition to meeting the applicable requirements of this section, occupancies in underground structures and windowless buildings meeting the purposes regulated by Chapters 8 through 29 shall meet the requirements of those chapters (*see 30-1.4*).

30-7.1.2* Windowless or underground structures with an occupant load of more than 50 persons shall be protected throughout by an approved automatic sprinkler system in accordance with Section 7-7.

Exception: Existing structures with an occupant load not greater than 100.

30-7.1.3 Windlowless or underground structures shall be provided with emergency lighting in accordance with Section 5-9.

Exception: One- and two-family dwellings.

30-7.2 Underground Structures.

30-7.2.1 Exits from underground structures having an occupant load greater than 50 shall be cut off from the level of exit discharge per Section 5-1, and 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 area served by the exits.

Exception No. 1: Existing structures with an occupant load not greater than 100.

Exception No. 2: As modified by Chapters 8 through 29.

30-7.2.2 Underground structures having an occupant load greater than 100 having combustible contents, interior finish or construction shall have automatic smoke venting facilities in accordance with Chapter 7 in addition to automatic sprinkler protection.

Exception: Existing structures.

CHAPTER 31 OPERATING FEATURES

SECTION 31-1 GENERAL REQUIREMENTS

(See also Sections 31-2 through 31-9 for special occupancy requirements.)

31-1.1 Construction, Repair, Improvement Operations.

31-1.1.1 Adequate escape facilities shall be maintained at all times in buildings under construction 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. See also NFPA 241, *Standard on Building Construction and Demolition Operations.*

31-1.1.2 Flammable or explosive substances or equipment for repairs or alterations may be introduced in a building of normally low or ordinary hazard classification while the building is occupied, only if the condition of use and safeguards provided are such as not to create any additional danger or handicap to egress beyond the normally permissible conditions in the building.

31-1.2 Means of Egress Reliability.

31-1.2.1 Every required exit, exit access or exit discharge shall be continuously maintained free of all obstructions or impediments to full instant use in the case of fire or other emergency.

31-1.2.2 Furnishings and Decorations in Means of Egress.

31-1.2.2.1 No furnishings, decorations, or other objects shall be so placed as to obstruct exits, access thereto, egress therefrom, or visibility thereof.

31-1.2.2.2 Hangings or draperies shall not be placed over exit doors or otherwise located as 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.

31-1.2.2.3 There shall be no obstruction by railings, barriers, or gates that divide the open space into sections appurtenant to individual rooms, apartments, or other uses. Where the authority having jurisdiction finds the required path of travel to be obstructed by furniture or other movable objects, the authority may require that they be fastened out of the way or may require that railings or other permanent barriers be installed to protect the path of travel against encroachment.

31-1.3 Equipment Maintenance and Testing.

31-1.3.1 Every required automatic sprinkler system, fire detection and alarm system, smoke control system, exit lighting, fire door, and other item of equipment required by this *Code* shall be continuously in proper operating condition.

31-1.3.2 Any equipment requiring test or periodic operation to assure its maintenance shall be tested or operated as specified elsewhere in this *Code* or as directed by the authority having jurisdiction.

31-1.3.3 Systems shall be under the supervision of a responsible person who shall cause proper tests to be made at specified intervals and have general charge of all alterations and additions.

31-1.3.4 Systems shall be tested at intervals recommended by the appropriate standards listed in Chapter 32.

31-1.3.5* Automatic Sprinkler Systems. All automatic sprinkler systems required by this *Code* shall be continuously maintained in reliable operating condition at all times, and such periodic inspections and tests shall be made as are necessary to assure proper maintenance.

31-1.3.6* Alarm and Fire Detection Systems. Fire alarm signaling equipment shall be restored to service as promptly as possible after each test or alarm and shall be kept in normal condition for operation. Equipment requiring rewinding or replenishing shall be rewound or replenished as promptly as possible after each test or alarm.

31-1.3.7 Periodic Testing of Emergency Lighting Equipment. A functional test shall be conducted on every required emergency lighting system at 30-day intervals for a minimum of 30 seconds. An annual test shall be conducted for the 1½-hour duration. Equipment shall be fully operational for the duration of the test. Written records of testing shall be kept by the owner for inspection by the authority having jurisdiction.

31-1.4 Furnishings, Decorations, and Treated Finishes. *(See also 31-1.2.2.)*

31-1.4.1* Draperies, curtains, and other similar furnishings and decorations shall be flame resistant where required by the applicable provisions of this chapter. These materials required herein to be tested in accordance with NFPA 701, *Standard Method of Fire Tests for Flame Resistant Textiles and Films*, shall comply with both the small- and large-scale tests.

31-1.4.2* Furnishings or decorations of an explosive or highly flammable character shall not be used.

31-1.4.3 Fire retardant coatings shall be maintained so as to retain the effectiveness of the treatment under service conditions encountered in actual use.

31-1.5* Fire Exit Drills.

31-1.5.1 Fire exit drills conforming to the provisions of this chapter of the *Code* shall be regularly conducted in occupancies where specified by the provisions of this chapter, or by appropriate action of the authority having jurisdiction. Drills shall be designed in cooperation with the local authorities.

31-1.5.2 Fire exit drills, where required by the authority having jurisdiction, shall be held with sufficient frequency to familiarize all occupants with the drill procedure and to have the conduct of the drill a matter of established routine.

31-1.5.3 Responsibility for the planning and conduct of drills shall be assigned only to competent persons qualified to exercise leadership.

31-1.5.4 In the conduct of drills emphasis shall be placed upon orderly evacuation under proper discipline rather than upon speed.

31-1.5.5* Drills shall include suitable procedures to make sure that all persons in the building, or all persons subject to the drill, actually participate.

31-1.5.6* Drills shall be held at unexpected times and under varying conditions to simulate the unusual conditions obtaining in case of fire.

31-1.6 Flammable Liquids. Flammable liquids shall be stored and handled in accordance with NFPA 30, *Flammable and Combustible Liquids Code.*

SECTION 31-2 ASSEMBLY OCCUPANCIES

31-2.1* Drills. The employees or attendants of places of public assembly shall be schooled and drilled in the duties they are to perform in case of fire, panic, or other emergency in order to be of greatest service in effecting orderly exit of assemblages.

31-2.1.1 Employees or attendants of assembly occupancies shall be instructed in the proper use of portable fire extinguishers and other manual fire suppression equipment if provided.

31-2.2* In theaters, motion picture theaters, auditoriums and other similar Class A and B assembly occupancies where there are noncontinuous programs, an audible announcement shall be made 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: Assembly occupancies in schools when used for nonpublic events.

31-2.3 Open Flame Devices. No open flame devices shall be used in any assembly occupancy.

Exception No. 1: Where necessary for ceremonial or religious purposes, the authority having jurisdiction may permit open flame lighting under such restrictions as are necessry to avoid danger of ignition of combustible materials or injury to occupants.*

Exception No. 2: Open flame devices may be used on stages where a necessary part of theatrical performances, provided adequate precautions satisfactory to the authority having jurisdiction are taken to prevent ignition of any combustible materials.

Exception No. 3: Gas lights may be permitted provided adequate precautions, satisfactory to the authority having jurisdiction, are taken to prevent ignition of any combustible materials.

Exception No. 4: Candles may be used on tables if securely supported on substantial noncombustible bases so located as to avoid danger of ignition of combustible materials and only if approved by the authority having jurisdiction. Candle flames shall be protected.

Exception No. 5: As permitted in 31-2.4.

31-2.4 Special Food Service Devices. Portable cooking equipment, not flue-connected, shall be permitted only as follows:

(a) Equipment fueled by small heat sources which can be readily extinguished by water, such as candles or alcohol-burning equipment (including "solid alcohol"), may be used provided adequate precautions satisfactory to the authority having jurisdiction are taken to prevent ignition of any combustible materials.

(b) Candles may be used on tables used for food service if securely supported on substantial noncombustible bases, so located as to avoid danger of ignition of combustible materials, and only if approved by the authority having jurisdiction. Candle flames shall be protected.

(c) "Flaming Sword" or other equipment involving open flames and flamed dishes such as cherries jubilee, crepes suzette, etc., may be permitted provided necessary precautions are taken, and subject to the approval of the authority having jurisdiction.

31-2.5 Smoking.

31-2.5.1 Smoking in assembly occupancies shall be regulated by the authority having jurisdiction.

31-2.5.2 In rooms or areas where smoking is prohibited, plainly visible "NO SMOKING" signs shall be posted.

31-2.5.3 No person shall smoke in prohibited areas which are so posted.

Exception: The authority having jurisdiction may permit smoking on a stage only when it is a necessary and rehearsed part of a performance and only by a regular performing member of the cast.

31-2.5.4 Where smoking is permitted, suitable ash trays or receptacles shall be provided in convenient locations.

31-2.6 Furnishings, Decorations and Stage Scenery.

31-2.6.1 Draperies, curtains, and other similar furnishings, decorations and stage settings shall be in accordance with the provisions of 31-1.4.

31-2.6.2 Only noncombustible materials, limited-combustible materials, or fire retardant pressure treated wood may be used for stage scenery or props, on the audience side of the proscenium arch.

31-2.6.3 The authority having jurisdiction shall impose controls on the amount and arrangement of combustible contents (including decorations) in assembly occupancies to provide an adequate level of safety to life from fire.

31-2.7 Seating.

31-2.7.1 Seats in assembly occupancies accommodating more than 200 persons shall be securely fastened to the floor except when fastened together in groups of not less than three nor more than seven and as permitted by 31-2.7.2. All seats in balconies and galleries shall be securely fastened to the floor, except in churches.

31-2.7.2 Seats not secured to the floor may be permitted in restaurants, night clubs, and other occupancies where the fastening of seats to the floor may be impracticable, provided that in the area used for seating (excluding dance floor, stage, etc.), there shall be not more than one seat for each 15 sq ft (1.4 sq m) of net floor area and adequate aisles to reach exits shall be maintained at all times.

Exception: Seating diagrams shall be submitted for approval of the authority having jurisdiction to allow increase in occupant load per 8-1.7.2 and 9-1.7.2.

31-2.7.3 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 his authorized agent. Signs shall be durable and shall indicate the number of occupants permitted for each room use.

31-2.8 Projection Room. Unless the projection room is constructed in accordance with NFPA 40, *Standard for the Storage and Handling of Cellulose Nitrate Motion Picture Film*, there shall be posted on the outside of each projection room door, and within the projection room proper, a conspicuous sign with 1-in. (2.5-cm) block letters stating: "Safety Film Only Permitted in This Room".

SECTION 31-3 EDUCATIONAL OCCUPANCIES

31-3.1 Drills.

31-3.1.1* Fire exit drills shall be conducted regularly in accordance with the applicable provisions of the following paragraphs.

31-3.1.2* There shall be at least two fire exit drills the first two weeks of a school term and eight additional fire exit drills a year. In climates where the weather is severe during the winter months, at least six drills should be held at the beginning of the school term and four drills after the winter months to complete the ten required drills.

31-3.1.3* Drills shall be executed at different hours of the day or evening; during the changing of classes; when the school is at assembly; during the recess or gymnastic periods; etc., so as to avoid distinction between drills and actual fires. If a drill is called when pupils are going up and down the stairways, as during the time classes are changing, the pupils shall be instructed to form in file and immediately proceed to the nearest available exit in an orderly manner.

31-3.1.4* Every fire exit drill shall be an exercise in school management for principal and teachers, with the chief purpose of every drill complete control of the class so that the teacher will form its ranks quickly and silently, may halt it, turn it, or direct it as desired. Great stress shall be laid upon the execution of each drill in a brisk, quiet and orderly manner. Running shall be prohibited. In case there are pupils incapable of holding their places in a line moving at a reasonable speed, provisions shall be made to have them taken care of by the more sturdy pupils, moving independently of the regular line of march.

31-3.1.5 Monitors shall be appointed from the more mature pupils to assist in the proper execution of all drills. They shall be instructed to hold open doors in the line of march or to close doors where necessary to prevent spread of fire or smoke, per 5-2.1.8. There shall be at least two substitutes for each appointment so as to provide for proper performance in case of absence of the regular monitors. The searching of toilet or other rooms shall be the duty of the teachers or other members of the staff. If the teachers are to do the searching, it should be done after they have joined their classes to the preceeding lines.

31-3.1.6 As all drills simulate an actual fire condition, pupils shall not be allowed to obtain clothing after the alarm is sounded, even when in home rooms, on account of the confusion which would result in forming the lines and the danger of tripping over dragging apparel.

31-3.1.7 Each class or group shall proceed to a predetermined point outside the building and remain there while a check is made to see that all are accounted for, leaving only when a recall signal is given to return to the building, or when dismissed. Such points shall be sufficiently far away from the building and from each other as to avoid danger from any fire in the building, interference with fire department operations, or confusion between different classes or groups.

31-3.1.8* Where necessary for drill lines to cross roadways, signs reading "STOP! SCHOOL FIRE DRILL," or equivalent, shall be carried by monitors to the traffic intersecting points in order to stop traffic during the period of the drill.

31-3.1.9* Fire exit drills in schools shall not include any fire extinguishing operations.

31-3.2 Signals.

31-3.2.1 All fire exit drill alarms shall be sounded on the fire alarm system.

31-3.2.2 Whenever 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 such other facilities as are available.

31-3.2.3 In order that pupils will not be returned to a building which is burning, the recall signal shall be one that is separate and distinct from, and cannot be mistaken for, any other signals. Such signals may be given by distinctive colored flags or banners. If the recall signal is electrical, the push buttons or other controls shall be kept under lock, the key for which shall be in the possession of the principal or some other designated person in order to prevent a recall at a time when there is a fire. Regardless of the method of recall, the means of giving the signal shall be kept under a lock.

31-3.3 Inspection.

31-3.3.1* It shall be the duty of principals and teachers to inspect all exit facilities daily in order to make sure that all stairways, doors, and other exits are in proper condition.

31-3.3.2 Open-plan buildings require extra surveillance to ensure that exit paths are maintained clear of obstruction and are obvious.

31-3.4 Day-Care Centers.

31-3.4.1 Fire prevention inspections shall be conducted monthly by a trained senior member of the staff. A copy of the latest inspection form shall be posted in a conspicuous place in the day-care facility.

31-3.4.2* An approved fire evacuation plan shall be executed not less than once per month.

31-3.4.3 Flammable and combustible liquids shall be stored in areas accessible only to designated individuals and as required in 31-1.6.

31-3.4.4 Wastebaskets and other waste containers shall be made of noncombustible materials.

31-3.5 Group Day-Care Homes. At least one operable flashlight shall be provided for each staff member in a location accessible to the staff for use in the event of a power failure.

31-3.6 Family Day-Care Homes. At least one operable flashlight shall be provided in a location accessible to the staff for use in the event of a power failure.

31-3.7 Furnishings and Decorations.

31-3.7.1 Draperies, curtains and other similar furnishings and decorations in educational occupancies shall be in accordance with the provisions of 31-1.4.

31-3.8 Child-prepared artwork and teaching materials may be attached directly to the walls and shall not exceed 20 percent of the wall area.

SECTION 31-4* HEALTH CARE OCCUPANCIES

31-4.1 Attendants, Evacuation Plan, Fire Exit Drills.

31-4.1.1 The administration of every hospital, nursing home and custodial 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 and for their evacuation to areas of refuge and from the building when necessary. All employees shall be periodically instructed and kept informed respecting 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 31-4.1.3 to 31-4.2.3 inclusive shall apply.

31-4.1.2 Every bed intended for use by health care occupants shall be easily movable under conditions of evacuation and shall be equipped with the type and size casters to allow easy mobility, especially over elements of the structure such as expansion plates and elevator thresholds. The authority having jurisdiction may make exceptions in the equipping of beds intended for use in areas limited to patients such as convalescent, self-care, or mental health patients.

31-4.1.3* Fire exit drills in health care occupancies shall include the transmission of a fire alarm signal and simulation of emergency fire conditions except that the movement of infirm or bed-ridden patients to safe areas or to the exterior of the building is not required. Drills shall be conducted quarterly on each shift to familiarize facility personnel (nurses, interns, maintenance engineers, and administrative staff) with signals and emergency action required under varied conditions. At least twelve drills shall be held every year. When drills are conducted between 9:00 p.m. (2100 hours) and 6:00 a.m. (0600 hours) a coded announcement may be used instead of audible alarms.

31-4.1.4 Employees of health care facilities shall be instructed in life safety procedures and devices.

31-4.2 Procedure in Case of Fire.

31-4.2.1* For health care occupancies, the proper protection of patients requires the prompt and effective actions of health care personnel. The basic actions 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, confining the effects of the fire by closing doors to isolate the fire area, and executing those evacuation duties as detailed in the Facility Firesafety Plan. See Appendix A for a more detailed suggested emergency plan.

31-4.2.2 A written facility firesafety plan shall provide for:

(a) Use of alarms

(b) Transmission of alarm to fire department

(c) Response to alarms

(d) Isolation of fire

(e) Evacuation of area

(f) Preparing building for evacuation

(g) Fire extinguishment.

31-4.2.3 All facility personnel shall be instructed in the use of, and response to, fire alarms; and, in addition, they shall be instructed in the use of the code phrase to ensure transmission of an alarm under the following conditions:

(a) When the discoverer of a fire must immediately go to the aid of an endangered person.

(b) 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 alarm station and shall then immediately execute their duties as outlined in the firesafety plan.

31-4.3 Maintenance of Exits. Proper maintenance shall be provided to ensure the dependability of the method of evacuation selected. Facilities which find it necessary to lock exits shall at all times maintain an adequate staff qualified to release and conduct occupants from the immediate danger area to a place of safety in case of fire or other emergency.

31-4.4* Smoking. Smoking regulations shall be adopted and shall include the following minimal provisions:

(a) Smoking shall be prohibited in any room, ward, or compartment where flammable liquids, combustible gases, or oxygen are used or stored and in any other hazardous location. Such areas shall be posted with "NO SMOKING" signs.

(b) Smoking by patients classified as not responsible shall be prohibited.

Exception to (b): When the patient is under direct supervision.

(c) Ashtrays of noncombustible material and safe design shall be provided in all areas where smoking is permitted.

(d) Metal containers with self-closing cover devices into which ash trays may be emptied shall be readily available to all areas where smoking is permitted.

31-4.5* Bedding, Furnishings and Decorations.

31-4.5.1 Draperies, curtains (including cubicle curtains) and other similar furnishings and decorations in health care

occupancies shall be in accordance with the provisions of 31-1.4.

31-4.5.2* Bedding, furnishings and decorations in health care occupancies shall be in accordance with the provisions of 31-1.4.

31-4.5.3* Combustible decorations are prohibited in any health care occupancy unless flame retardant.

Exception: Combustible decorations of such limited quantities that a hazard of fire development or spread is not present, such as photographs and paintings.

31-4.5.4 Wastebaskets and other waste containers shall be of noncombustible or other approved materials.

31-4.6 Where engineered smoke control systems are provided in accordance with Chapter 12, such systems shall be tested to verify proper operation in accordance with design criteria prior to occupancy.

SECTION 31-5 DETENTION AND CORRECTIONAL OCCUPANCIES

31-5.1 Attendants, Evacuation Plan, Fire Exit Drills.

31-5.1.1 Detention and correctional facilities, or those portions of facilities having such occupancy, must be provided with 24-hour staffing. Staff must be within three floors or 300 ft (91 m) horizontal distance of the access door of each resident housing area.

In addition, for Use Conditions III, IV and V, the arrangement shall be such that the staff involved can start release of locks necessary for emergency evacuation or rescue and initiate other necessary emergency actions within two minutes of alarm.

31-5.1.2* Provisions shall be made so that residents in Use Conditions III, IV and V can readily notify staff of an emergency.

31-5.1.3 The administration of every detention or correctional facility shall have in effect and provided to all supervisory personnel written copies of a plan for the protection of all persons in the event of fire and for their evacuation to areas of refuge and 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.

31-5.1.4 Employees of detention and correctional occupancies shall be instructed in the proper use of portable fire extinguishers and other manual fire suppression equipment that they may be called upon to use. With respect to new staff, such training shall be provided promptly upon entrance on duty. With respect to existing staff, refresher training shall be provided at least annually.

31-5.2 Books, clothing and other combustible personal property allowed in sleeping rooms shall be stored in closable metal lockers or a fire-resistant container.

31-5.3 The amount of heat-producing appliances (such as toasters, hot plates, etc.) and the overall use of electrical power within a sleeping room shall be controlled by facility administration.

31-5.4 Furnishings and Decorations.

31-5.4.1 Draperies, curtains (including privacy curtains) and other similar furnishings and decorations in detention and correctional occupancies shall be in accordance with the provisions of 31-1.4.

31-5.4.2* Combustible decorations are prohibited in any detention or correctional occupancy unless flame retardant.

31-5.4.3 Wastebaskets and other waste containers shall be of noncombustible or other approved materials.

31-5.4.4 Furnishings, such as mattress and upholstered or cushioned furniture, shall not be of a highly flammable character.

31-5.5 All keys necessary for unlocking doors installed in means of egress shall be individually identified by both touch and sight.

SECTION 31-6 RESIDENTIAL OCCUPANCIES

31-6.1 Hotel Emergency Organization.

31-6.1.1* All employees of hotels shall be instructed and drilled in the duties they are to perform in the event of fire, panic, or other emergency.

31-6.1.2* Drills of the emergency organization shall be held at monthly intervals, covering such points as the operation and maintenance of the available first aid fire appliances, the testing of guest alerting devices, and a study of instructions for emergency duties.

31-6.2 Emergency Duties.

31-6.2.1 Upon discovery of fire, some or all of these duties will become immediately imperative, the number and sequence depending upon the exact situation encountered —

Alarms

Notify office.
Notify public fire department.
Notify private fire brigade.

Guests

Warn guests or others who are or may become endangered.

Assist occupants to safety, with special attention to aged, infirm, or otherwise incapacitated persons.

Search rooms to be sure all occupants have escaped.

Man all elevators (including those of automatic type) with competent operators.

Extinguishment

Extinguish or control the fire, using available first aid equipment.

Send messenger to meet public fire department upon arrival in order to direct latter to exact location of fire. (The public fire department is in full command upon arrival.)

Special Equipment

Fire Pumps — stand by for instant operation.

Ventilating Equipment — in case of dense smoke, stand by, operate under proper instructions to clear area affected.

Refrigerating Equipment — if machines are definitely endangered, shut them down and blow refrigerant to sewer or atmosphere to prevent explosion.

Generators and Motors — protect against water damage with tarpaulins — shut down motors not needed — keep generators operating to furnish lights, elevator power, etc.

Boilers — if necessary to abandon boiler room, extinguish or dump fire and lower steam pressure by blowing to sewer or atmosphere to prevent possible explosion.

31-6.3 Dormitories.

31-6.3.1 Drills. Fire exit drills shall be regularly conducted in accordance with 31-1.5.

31-6.4 Emergency Instructions for Residents or Guests. Fire-safety information shall be posted in every guest room in hotels and every resident room in dormitories in a location and manner as determined by the authority having jurisdiction.

31-6.5 Furnishings and Decorations.

31-6.5.1 New draperies, curtains and other similar furnishings and decorations in hotels and dormitories shall be in accordance with the provisions of 31-1.4.

SECTION 31-7 BOARD AND CARE HOMES

31-7.1 Evacuation 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 the protection of all persons in the event of fire and for their evacuation to areas of refuge and from the building when necessary. The plan shall include special staff actions including fire protection procedures needed to ensure the safety of any resident and shall be amended or revised upon admission to the home of any resident with unusual needs. All employees shall be periodically instructed and kept informed in respect to their duties and responsibilities under the plan. Such instruction shall be reviewed by the staff at least every two months. A copy of the plan shall be readily available at all times within the facility.

31-7.2 Resident Training. All residents capable of assisting in their evacuation shall be trained in the proper actions to take in the event of a fire. This training shall include actions to take if the primary escape route is blocked. If the resident is given rehabilitation or habilitation training, training in fire prevention and actions to take in the event of a fire shall be a part of the rehabilitation training program. Residents shall be trained to assist each other in case of fire to the extent their physical and mental abilities permit them to do so without additional personal risk.

31-7.3 Fire Exit Drills. Fire exit drills shall be conducted at least six times per year, two times a year on each shift. Twelve drills shall be conducted the first year of operation. The drills may be announced in advance to the residents. The drills shall involve the actual evacuation of all residents to a selected assembly point and shall provide residents with experience in exiting through all exits required by the *Code*. Exits not used in any fire drill shall not be credited in meeting the requirements of this *Code* for board and care homes.

Exception No. 1: Actual exiting from windows shall not be required to meet the requirements of this section; opening the window and signaling for help shall be an acceptable alternative.

Exception No. 2: If the board and care home has an evacuation capability rating of "Impractical," those residents who cannot meaningfully assist in their own evacuation or who have special health problems need not actively participate in the drill. Section 31-4 applies in such instances.

31-7.4 Smoking.

31-7.4.1 Where smoking is permitted, noncombustible safety-type ash trays or receptacles shall be provided in convenient locations.

SECTION 31-8 MERCANTILE OCCUPANCIES

31-8.1 Drills. In every Class A or B store, employees shall be regularly trained in fire exit drill procedures, in general conformance with 31-1.5.

31-8.2 Employees of mercantile occupancies shall be instructed in the proper use of portable fire extinguishers.

SECTION 31-9 BUSINESS OCCUPANCIES

31-9.1 Drills. In any building subject to occupancy by more than 500 persons or more than 100 above or below the street level, employees and supervisory personnel shall be instructed in fire exit drill procedures in accordance with 31-1.5 and shall hold practice drills periodically where practicable.

31-9.2 Employees of business occupancies shall be instructed in the proper use of portable fire extinguishers.

CHAPTER 32
REFERENCED PUBLICATIONS

(See Appendix B for other referenced publications which are advisory and thus do not constitute part of the requirements of this Code.)

32-1 The following documents or portions thereof are referenced within this *Code* and shall be considered part of the requirements of this *Code* to the extent called for by the *Code*. The edition indicated for each reference is current as of the date of the NFPA issuance of this document. These references are listed separately to facilitate updating to the latest edition by the user.

The numbers in parentheses represent the paragraph numbers from other chapters of this *Code* which reference, in a mandatory way, the given publication.

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

32-1.1 NFPA Publications. The following publications are available from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

NFPA 10-1985, *Standard for Portable Fire Extinguishers* (7-7.4.1, 31-1.3.4)

NFPA 11-1983, *Standard for Low Expansion Foam and Combined Agent Systems* (7-7.3, 31-1.3.4)

NFPA 11A-1983, *Standard for Medium and High Expansion Foam Systems* (7-7.3, 31-1.3.4)

NFPA 12-1985, *Standard on Carbon Dioxide Extinguishing Systems* (7-7.3, 31-1.3.4)

NFPA 12A-1980, *Standard on Halon 1301 Fire Extinguishing Systems* (7-7.3, 31-1.3.4)

NFPA 12B-1980, *Standard on Halon 1211 Fire Extinguishing Systems* (7-7.3, 31-1.3.4)

NFPA 13-1985, *Standard for the Installation of Sprinkler Systems* (6-2.2.3.7, 7-7.1.1, 16-1.5.1, 17-1.5.1, 18-1.5.1, 19-1.5.1, 20-1.5.1, 22-2.1.2, 26-1.5.2, 27-1.5.2, 31-1.3.4)

NFPA 13D-1984, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Mobile Homes* (7-7.1.1, 21-2.2.2.5, 21-2.2.3.5, 21-2.2.4.5, 22-2.1.2, 31-1.3.4)

NFPA 14-1983, *Standard for the Installation of Standpipe and Hose Systems* (7-7.4.1, 31-1.3.4)

NFPA 15-1985, *Standard for Water Spray Fixed Systems for Fire Protection* (7-7.3, 31-1.3.4)

NFPA 16-1980, *Standard for the Installation of Foam-Water Sprinkler Systems and Foam-Water Spray Systems* (7-7.3, 31-1.3.4)

NFPA 17-1985, *Standard for Dry Chemical Extinguishing Systems* (7-7.3, 31-1.3.4)

NFPA 20-1983, *Standard for the Installation of Centrifugal Fire Pumps* (7-7.3, 31-1.3.4)

NFPA 30-1984, *Flammable and Combustible Liquids Code* (6-4.3, 31-1.6)

NFPA 31-1983, *Standard for the Installation of Oil Burning Equipment* (7-2.2)

NFPA 40-1982, *Standard for the Storage and Handling of Cellulose Nitrate Motion Picture Film* (8-3.2.2.1, 9-3.2.2.1, 31-2.8)

NFPA 45-1982, *Standard on Fire Protection for Laboratories Using Chemicals* (10-3.2.4, 11-3.2.4)

NFPA 54-1984, *National Fuel Gas Code* (7-1.1, 7-2.2)

NFPA 58-1983, *Standard for Storage and Handling of Liquefied Petroleum Gases* (7-1.1)

NFPA 70-1984, *National Electrical Code* (5-9.2.2, 7-1.2, 7-2.2, 8-4.1.5, 10-4.1.5, 12-5.1.2, 14-5.1.2, 15-5.1.2, 24-4.4.6, 25-4.4.6, 26-4.3.6, 27-4.3.6)

NFPA 71-1982, *Standard for the Installation, Maintenance and Use of Central Station Signaling Systems* (7-6.1.3, 7-6.4, 31-1.3.4)

NFPA 72A-1985, *Standard for the Installation, Maintenance and Use of Local Protective Signaling Systems* (7-6.1.3, 7-6.3.3, 12-3.4.1.3, 14-3.4.1.3, 15-3.4.1.3, 31-1.3.4)

NFPA 72B-1979, *Standard for the Installation, Maintenance and Use of Auxiliary Protective Signaling Systems* (7-6.1.3, 7-6.4, 31-1.3.4)

NFPA 72C-1982, *Standard for the Installation, Maintenance and Use of Remote Station Protective Signaling Systems* (7-6.1.3, 7-6.4, 31-1.3.4)

NFPA 72D-1979, *Standard for the Installation, Maintenance and Use of Proprietary Protective Signaling Systems* (7-6.1.3, 7-6.4, 31-1.3.4)

NFPA 72E-1984, *Standard on Automatic Fire Detectors* (5-2.1.8, 6-3.4.2, 6-3.4.3, 7-6.1.3, 18-3.4.4.2, 19-3.4.4.2, 21-3.2.2.5, 31-1.3.4)

NFPA 74-1984, *Standard for the Installation, Maintenance and Use of Household Fire Warning Equipment* (7-6.1.3, 7-6.2.7, 31-1.3.4)

NFPA 80-1983, *Standard for Fire Doors and Windows* (6-2.2.11, 12-3.6.4, 13-3.6.4, 31-1.3.4)

NFPA 82-1983, *Standard on Incinerators, Waste and Linen Handling Systems and Equipment* (7-5.2)

NFPA 90A-1985, *Standard for the Installation of Air Conditioning and Ventilating Systems* (6-2.3.1, 7-2.1, 12-3.1.1)

NFPA 90B-1984, *Standard for the Installation of Warm Air Heating and Air Conditioning Systems* (7-2.1)

NFPA 91-1983, *Standard for the Installation of Blower and Exhaust Systems* (7-2.2)

NFPA 96-1984, *Standard for the Installation of Equipment for the Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment* (7-2.3, 31-1.3.4)

NFPA 99-1984, *Standard for Health Care Facilities* (12-2.8.2, 12-2.9.2, 12-2.10.2, 12-3.2.2, 12-5.1.3, 12-6.2.9.2, 12-6.3.2.1, 12-6.3.2.2, 13-3.2.2, 13-6.2.9.2, 13-6.3.2.1, 13-6.3.2.2, 31-1.3.4)

NFPA 102-1978, *Standard for Assembly Seating, Tents, and Air-Supported Structures* (8-2.5.3, 8-2.5.5.10, 8-4.2.1, 9-2.5.3, 9-2.5.5.10, 9-4.2.1)

NFPA 211-1984, *Standard for Chimneys, Fireplaces, Vents and Solid Fuel Burning Appliances* (7-2.2, 12-5.2.2)

NFPA 220-1979, *Standard on Types of Building Construction* (6-2.1, 13-5.2.2)

NFPA 241-1980, *Standard for Safeguarding Building Construction and Demolition Operations* (31-1.1.1)

NFPA 251-1985, *Standard Methods of Fire Tests of Building Construction and Materials* (Section 3-2, 6-2.2.10, 12-3.6.1, 13-3.6.1)

NFPA 252-1984, *Standard Methods of Fire Tests of Door Assemblies* (5-1.3.3, 6-2.2.5, 6-2.2.11, 12-3.6.3, 13-3.6.3)

NFPA 253-1984, *Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source* (Section 3-2, 6-5.3.2)

NFPA 255-1984, *Standard Method of Test of Surface Burning Characteristics of Building Materials* (6-5.2.2)

NFPA 256-1982, *Standard Methods of Fire Tests of Roof Coverings* (12-1.6.2, 13-1.6.2, 15-1.6.2, 21-3.2.2.2)

NFPA 257-1980, *Standard for Fire Tests of Window Assemblies* (Section 3-2, 6-2.2.11)

NFPA 701-1977, *Standard Methods of Fire Tests for Flame-Resistant Textiles and Films* (8-3.2.1.11, 31-1.4.1)

NFPA 703-1979, *Standard for Fire-Retardant Impregnated Wood and Fire-Retardant Coatings for Building Materials* (6-5.4.1)

NFPA 1221-1984, *Standard for the Installation, Maintenance and Use of Public Fire Service Communications* (7-6.1.3, 31-1.3.4)

32-1.2 Other Publications.

ANSI A14.3-1974, *Safety Code for Fixed Ladders*, American National Standards Institute, 1430 Broadway, New York, NY 10018 (5-2.9.2)

ANSI/ASME A17.1-1984, *Safety Code for Elevators and Escalators*, American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017 (7-4.2, 7-4.3, 7-4.4, 7-6.5.2)

ASTM E136-1979, *Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°F*, American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103 (Section 3-2)

UL 647-1983, *Standard for Unvented Kerosene-fired Room Heaters and Portable Heaters*, Underwriters Laboratories Inc., 333 Pfingston Road., Northbrook, IL 60062 (11-9.5.2.1 Exception)

APPENDIX A

This Appendix is not a part of the requirements of this NFPA document, but is included for information 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 and references to standards.

CHAPTER 1

A-1-3.1 Panic. The *Code* recognizes that panic in a burning building may 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, so long as occupants of buildings are moving toward exits which they can see within a reasonable distance with no 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 stoppage of exit travel, such as may occur when one person stumbles and falls on the stairs, may be conducive to panic. Panic danger is greatest when there are numbers of people in a confined area.

A-1-4.4 In existing buildings it is not always practical to strictly apply the provisions of this *Code*. Physical limitations may require disproportionate effort or expense with little increase in life safety. In such cases the authority having jurisdiction shall satisfy himself that reasonable life safety is assured.

In existing buildings it is intended that any condition which represents a serious threat to life be mitigated by application of appropriate safeguards. It is not intended to require modifications for conditions which do not represent a significant threat to life even though the circumstances are not literally in compliance with the *Code*.

A-1-4.6 The following is an example of what is intended by 1-4.6. In a hospital which has 6-ft (183-cm) corridors, these corridors cannot be reduced in width even though the requirements for existing buildings do not require 6-ft (183-cm) wide corridors. However, if a hospital had 10-ft (3-m) wide corridors they may be reduced to 8 ft (244 cm) which is the requirement for new construction. If the hospital corridor was 3 ft (91 cm) wide it would have to be increased to 4 ft (122 cm). If alterations require replacement of a portion of a hospital corridor wall, this portion of the wall should be increased to 1-hour fire resistance in accordance with the requirements for new construction. However, it would not be required that the corridor width be increased to 8 ft (244 cm) unless it was practical to do so.

A-1-5.1 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 goals stated in Chapter 2, Fundamental Requirements.

A-1-6.3 Fatal fires have occurred when a required stairway has been closed for repairs or removed for rebuilding, when a required automatic sprinkler system has been shut off to change piping, etc.

CHAPTER 2

A-2-1 It is not always necessary to completely evacuate the building or structure to escape from a fire or other emergency. An area of refuge formed by horizontal exits, smoke barriers, other floors, or like compartmentation often can serve as a place for the occupants to remain in relative safety until the emergency is over. In those occupancies where access to the exits is by way of enclosed corridors, particularly with sleeping occupants, a single fire may block access to all exits, including horizontal exits and smoke barriers. In such cases, the occupants may achieve a greater degree of safety by remaining in their rooms.

A-2-10 The provisions of this *Code* will not necessarily provide a building suitable for use by physically handicapped people. Reference is made to ANSI A117.1, *Specifications for Making Buildings and Facilities Accessible to and Usable by the Physically Handicapped* (*see Appendix B*).

CHAPTER 3

A-3-2 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 or 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 concerned with product evaluations which is in a position to determine compliance with appropriate standards for the current production of listed items.

A-3-2 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, 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 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 Fire Compartment. In the provisions of 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-3-2 Limited Combustible. See NFPA 259, *Standard Test Method for Potential Heat of Building Materials* and NFPA 220, *Standard Types of Building Construction* (*see Appendix B*).

A-3-2 Smoke Compartment. In the provision of smoke compartments utilizing 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.

CHAPTER 4

A-4-1.1 A detailed breakdown of occupancy classification is available from the National Fire Protection Association. [*See NFPA 901, Uniform Coding for Fire Protection (see Appendix B).*]

A-4-1.2 Such 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 to the public, or may on occasion be open to the public, and the occupants, 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. The need for alternate exit routes for small commercial places of assembly, such as restaurants, lounges, theaters, etc., with capacities of as few as 50 persons, is specially treated in this method of classification. Special conference rooms, snack areas, etc., incidental to and under the control of the management of other occupancies, such as offices, fall under the 50-person limitation.

A-4-1.3 Educational occupancy is distinguished from assembly in that the same occupants are regularly present and they are subject to discipline and control.

A-4-1.7 Office, storage, and service facilities incidental to the sale of merchandise and located in the same building are included with mercantile occupancy.

A-4-1.8 Doctors' and dentists' offices are included unless of such character as to be classified as hospitals. Service facilities usual to city office buildings such as newsstands, lunch counters serving less than 50 persons, barber shops and beauty parlors are included in this 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 classed as assembly occupancies.

A-4-1.10 Storage properties are characterized by the presence of relatively small numbers of persons in proportion to the area; any new use which increases the number of occupants to a figure comparable with other classes of occupancy changes the classification of the building to that of the new use.

A-4-2.1.3 Under this provision any violation of the requirements of Chapters 8 through 30 for segregation or protection of hazardous operation or storage would inherently involve violation of the other sections of the *Code* unless additional exit facilities appropriate to high hazard contents were provided.

A-4-2.2.1 These classifications do not apply to the application of sprinkler protection classifications. [*See NFPA 13, Installation of Sprinkler Systems (see Appendix B).*]

A-4-2.2.2 Chapter 29, Storage Occupancies, recognizes storage of noncombustible materials as low hazard. In other occupancies it is assumed that even where the actual contents hazard may normally be low, there is sufficient likelihood that some combustible material or hazardous operations will be introduced in connection with building repair or maintenance, or that some psychological factor might create conditions conducive to panic, so that the exit facilities cannot safely be reduced below those specified for ordinary hazard contents.

A-4-2.2.3 This 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-4-2.2.4 High hazard contents may include occupancies where gasoline and other flammable liquids are handled or used or are stored under conditions involving possible release of flammable vapors; where grain dust, wood flour or plastic dusts, aluminum or magnesium dust, or other explosive dusts may be 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 28, Industrial Occupancies, and Chapter 29, Storage Occupancies, include detailed provisions on high hazard contents.

CHAPTER 5

A-5-1.1.1 Portable ladders, rope fire escapes, and similar emergency escape devices may 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 quite unsuited to use by aged or infirm persons or by small children. Therefore, such devices may give a false sense of security and should not be made an excuse for not providing standard exit facilities.

A-5-1.2.3 In the case of a stairway, the exit includes the door to the stairway enclosure, stairs and landings inside the enclosure, the door from the stairway enclosure to the street or open air, or any passageway and door necessary to provide a path of travel from the stairway enclosure to the street or open air. In the case of a door leading directly from the street floor to the street or open air, the exit comprises only the doorway.

Doors of small individual rooms, as in hotels, while constituting exit access from the room, are not referred to as exits except when they lead directly to the outside of the building or other place of safety.

A-5-1.2.5 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.

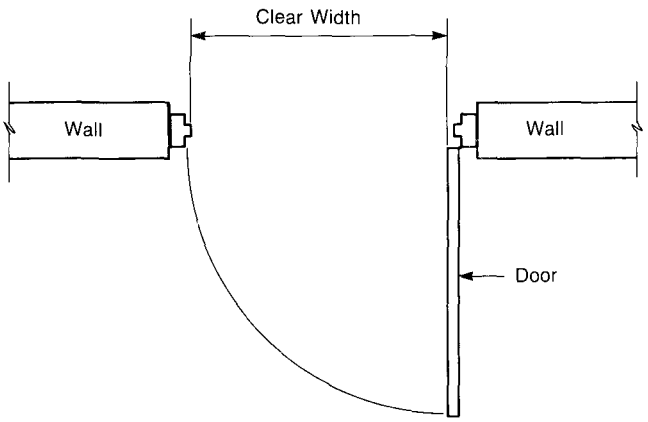
A-5-1.3.3 The purpose of a tight-fitting door is to control the flow of smoke. The tight fit can be achieved by close attention to tolerances or by supplemental means. In no case should the "crack dimensions" exceed the maximum tolerances allowed in NFPA 80, *Standard for Fire Doors and Windows* (*see Appendix B*).

A-5-1.5 Headroom on stairs is the vertical distance above a plane parallel to and tangent with the most forward projection of the stair tread.

A-5-1.7.3 Means of egress must permit unobstructed travel at all times. Any type 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-5-2.1.2.1 Figure A-5-2.1.2.1 illustrates the difference in measuring the width of doors in new and existing buildings.

In New Buildings the Actual Net Unobstructed Width of the Door Opening is Measured



Door Stop and Hinge Stile Projections are Disregarded in Determining Width in Existing Buildings.

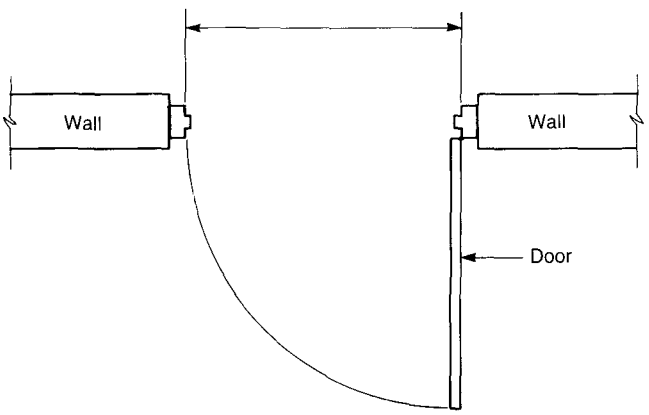


Figure A-5-2.1.2.1

A-5-2.1.3.1 The minimum width for the leaf of a door in an exit recommended in this paragraph may not be adequate for the normal usage of the doorway for purposes other than exiting.

A-5-2.1.4.1 Doors which are designed to prevent spread of fire through wall openings are not necessarily suitable for use on exits, and some doors may involve a personal injury hazard if used on exits.

Where doors are subject to two-way traffic, a desirable practice is to locate a small wired glass panel in the door to avoid accidents.

See other sections of the *Code* such as 5-2.1.4.4 and 5-2.4.3.3 for special treatment of the direction of swing of doors used as exit access and doors used in horizontal exits.

A-5-2.1.4.2 This section is not intended to apply to the swing of cross corridor doors such as smoke barrier doors and horizontal exits.

A-5-2.1.4.4 There are various methods by which the function of screen or storm doors may be provided without having any door swing against the exit travel. A screen or storm door may be used in the same doorway with an ordinary door by means of a vestibule of sufficient size as to permit the inner door to swing outwardly without interfering with the operation of the door at the other end of the vestibule.

A jalousie door, with a screen or storm sash panel, provides the function of both a regular door and screen or storm sash, all in a single unit.

A-5-2.1.5.2 This arrangement makes it possible to leave the stairway at such floor should the fire render the lower part of the stair unusable during egress or should the occupants seek refuge on another floor.

A-5-2.1.5.3 This requirement may be satisfied by the use of conventional types of hardware, whereby the door is released by the turning of a knob or handle, or pushing against a panic bar, but not by unfamiliar methods of operation such as a blow to break glass.

A-5-2.1.6.2 In the event that the authority having jurisdiction has allowed increased operation time the sign should reflect the appropriate time.

A-5-2.1.11.1 Turnstiles placed in subway or other rapid transit stations and other assembly occupancies to prevent the entrance of persons without paying fare or admission fee may be a serious obstruction to rapid egress in case of fire or other emergency, even though such turnstiles are designed to permit persons to leave. Multiple bar turnstiles designed to prevent persons from crawling over, under, or around the bars are more objectionable than single bar turnstiles, such as the coin-operated type, but any type of turnstile involves some interference with egress. Where turnstiles are used, required exit facilities may be provided by alternate exits of the swinging-gate type, with visual supervision by employees to prevent improper use.

A-5-2.2.2.1 Recommendations on tread and riser dimensions can be found in NBS BSS 120 and *Scientific American*, October 1974 (*see Appendix B*). It is the intent of 5-2.2.2.1 to use the table "Existing Stairs" in existing buildings even when there is a change in occupancy per 1-6.4.

A-5-2.2.3.2 Figure A-5-2.2.3.2 indicates wall openings needing protection in accordance with 5-2.2.3.2. Openings needing protection are shown as shaded.

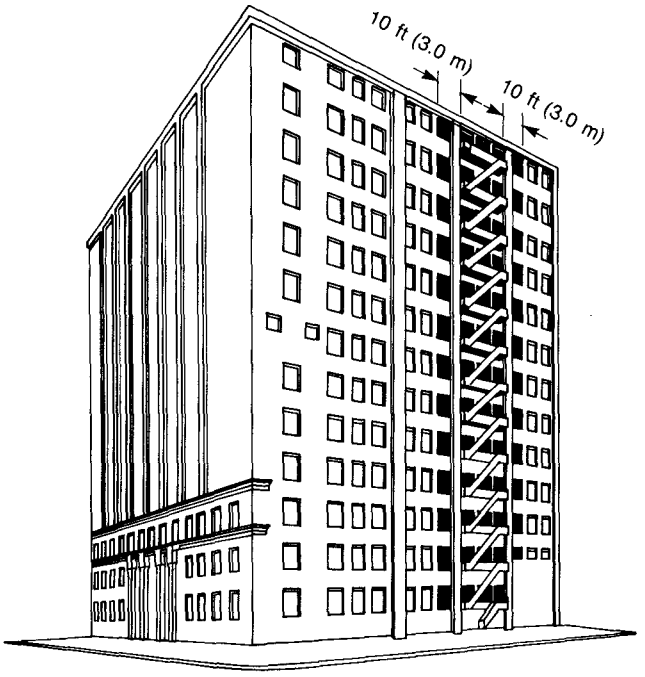


Figure A-5-2.2.3.2

A-5-2.2.3.5 The guards that are required by 5-2.2.6 will usually meet this requirement when 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 the requirements for stairs over three stories in height.

A-5-2.2.4.4 When walking up or down stairs a person's foot exerts a smaller horizontal force against treads than achieved when walking on level floors. Therefore, materials that are acceptable as slip resistant for floors (as described by ASTM) provide adequate slip resistance when used for stair treads, including the important leading edges of treads — the part of the tread which the foot first contacts during descent, the most critical direction of travel. If stair treads are wet there may be an increased danger of slipping just as there may be 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 NBS BSS 120 (see Appendix B), p. 33.*] When environmental conditions (such as illumination levels and directionality or a complex visual field drawing 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 permits 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-5-2.2.4.7 Exception The following diagram illustrates the intent of the Exception to 5-2.2.4.7.

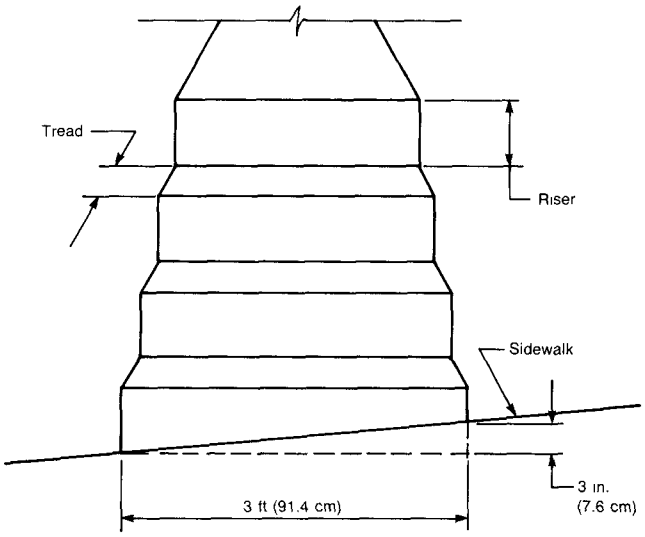


Figure A-5-2.2.4.7 Exception

A-5-2.2.4.8 The following diagram illustrates the method for measuring tread depth.

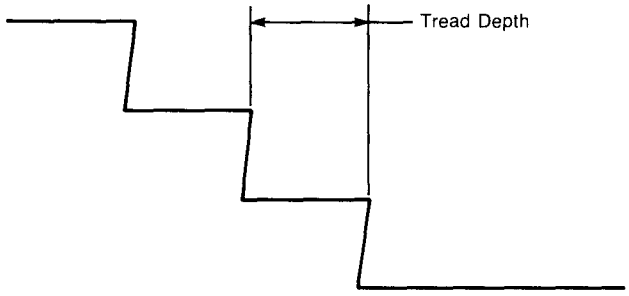
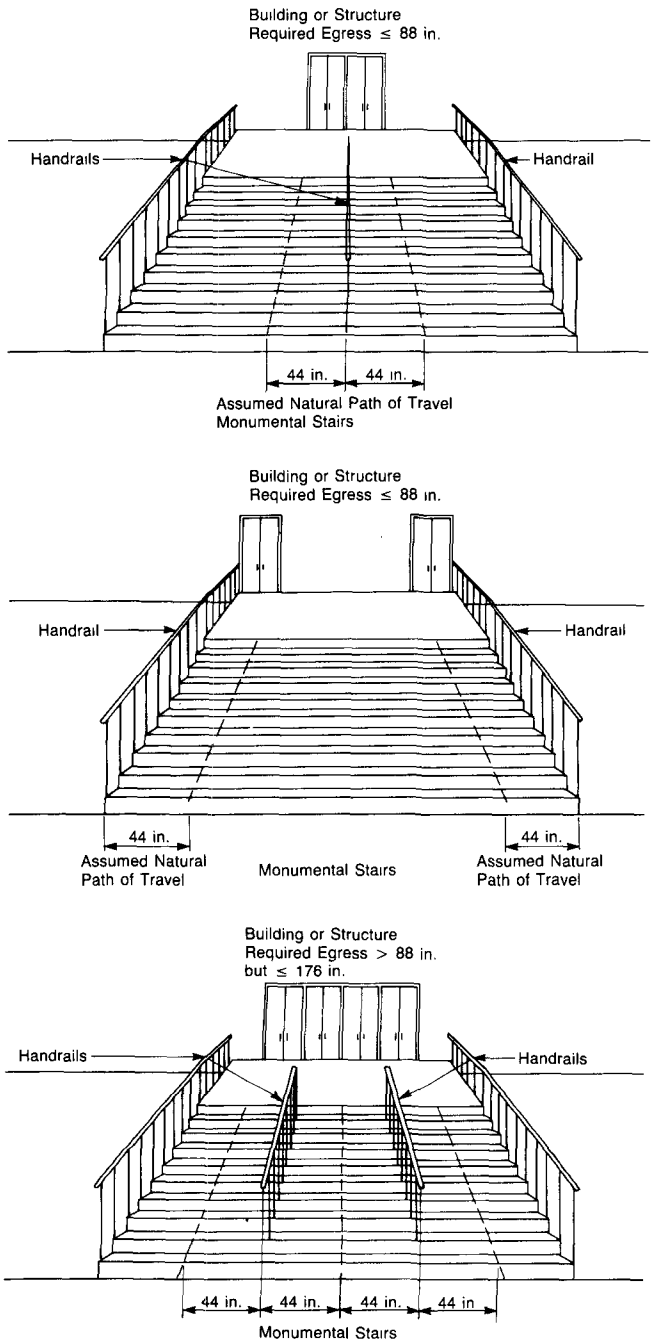


Figure A-5-2.2.4.8

A-5-2.2.6.1 The intent of this provision is to place handrails for only the required exit width of stairs regardless of the actual width of the stairs. The required exit width is along the natural path of travel to and from the building. Examples of this requirement are shown in Figure A-5-2.2.6.1. A reduced intermediate handrail spacing of approximately 60 in. (152 cm), along with a handrail height at the upper limit of permissible heights, is recommended in public assembly, educational and similar occupancies where crowds of people must simultaneously use a stair for normal access and egress as well as for emergency egress. This permits everyone to reach and grasp one handrail. Except as noted in 5-2.2.6.2 and 5-2.2.6.4 handrails are not required on stair landings.



Conversion: 1 in. = 2.54 cm.

Figure A-5-2.2.6.1

A-5-2.2.6.4 Aisle stairs forming part of a required means of egress should be provided with handrails located along the centerline of such aisles or at one side of such aisle. Center aisle handrails may be made up of short sections, with returns to the stair, and with the resulting gaps not greater than 36 in. (91 cm) measured horizontally.

A-5-2.2.6.4(b) This 1½-in. (3.8-cm) clearance assumes that the wall adjacent to the handrail is a smooth surface. Where rough wall surfaces are used, greater clearances are recommended.

A-5-2.2.6.4(d) Handrails should be designed so that they can be grasped firmly with a comfortable grip and so that 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 to 2 in. (3.8 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.

It should be noted that 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. At all times in handrail design it is useful to remember the effectiveness of a simple round profile that permits some locking action by fingers as they curl around the handrail.

A-5-2.2.6.4(f) Figure A-5-2.2.6.4(f) illustrates some of the requirements of 5-2.2.6.4.

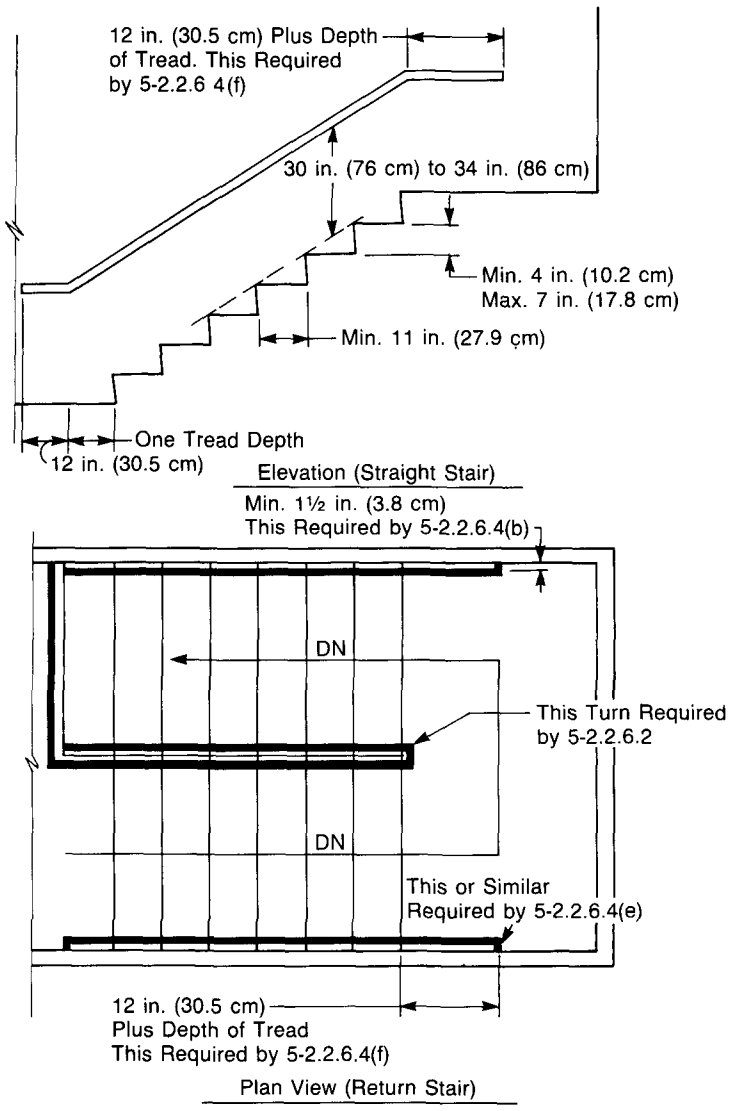


Figure A-5-2.2.6.4(f)

A-5-2.3.2 The following guidance is provided for specifying a level of performance for limitations of products of combustion from entering a smokeproof stair enclosure.

The smoke control system should ensure, on a 97 percent basis for the geographical location of the building, that the atmosphere of the smokeproof enclosure will not, during a period of 2 hours, include a quantity of air emanating from the fire area that is more than 1 percent of the volume of the smokeproof stair enclosure.

The 97 percent basis for the outside winter temperature may be obtained from the ASHRAE *Handbook of Fundamentals* (*see Appendix B*).

A-5-2.4.1 Example: A department store building 270 ft by 210 ft (82 m by 64 m) (occupant load 945 per floor) would be required by this *Code* to have exits from the upper floors sufficient to furnish 16 units of exit width. This would ordinarily require eight 44-in. (112-cm) stairways.

Assume now this building is divided by a fire wall into two sections, one 100 ft by 210 ft (30 m by 64 m) and the other 170 ft by 210 ft (52 m by 64 m), with doors through the wall furnishing horizontal exits. The smaller section, considered separately, will require three 2-unit exits and the larger section will require five 2-unit 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 2-unit stairs from the smaller section and three 2-unit stairs from the larger section will be required, if the exits can be arranged to meet the requirements for the 150-ft (45-m) distance from any point which can be done in a sprinklered building. Thus, the total number of stairways required for the building will be five, as compared with eight if no horizontal exit is provided. Another option would be the use of two 2½-unit stairs from the larger section, which would reduce the total number of stairways required to four. However, if the building were further subdivided by a second fire wall with fire doors in openings, no further reduction in stairways would be permitted.

A-5-2.4.2.2 This requirement can be complied with only where the entire areas from each side of the horizontal exit to the stairways or other standard means of egress are occupied by the same tenant or where there are public corridors or other continuously available passageways leading from each side of the exit to stairways or other standard means of egress leading to outside the building.

A-5-2.4.3.2 NFPA 80, *Standard for Fire Doors and Windows*, describes the installation of fire doors (*see Appendix B*).

A-5-2.4.3.4 Automatic doors which are often installed covering the entire cross section of a building corridor do not qualify as horizontal exits under these provisions, as dangerous quantities of smoke might pass through the corridor before there is sufficient heat to close the door.

Automatic sliding doors are also subject to the objection that once closed they are difficult to open, and thus may trap people behind them in the absence of other available means of escape.

A-5-2.4.4.7 One or two steps at a doorway are considered to constitute an accident hazard in emergency use. Stairways with level landings between door and stair are satisfactory.

A-5-2.5.3.3 The protection requirements for wall openings exposing ramps are the same as for outside stairs.

See Figure A-5-2.2.3.2 for an example of openings needing protection.

A-5-2.5.3.4 This is to prohibit closets and similar spaces under ramps within the enclosure. It is not to be interpreted to prohibit an enclosed ramp beneath another flight.

A-5-2.5.3.5 The guards required by 5-2.2.6 for the unenclosed sides of ramps will usually meet this requirement when 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-5-2.6 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 other stair that continues to the street floor. Probably the most important use of an exit passageway is to satisfy the requirement that exit stairs shall discharge directly outside from multistory buildings. 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 distance of travel to reach an exit would otherwise be excessive.

A-5-2.8.1.1 Fire escape stairs comprise an unfamiliar means of egress to most occupants of a building. Persons using fire escape stairs from a considerable height can be timid and seriously slow the rate of descent for themselves and people behind them. Since these stairs are used only in emergencies, maintenance is often neglected and they should be inspected on a regular basis.

Fire escape stairs can, however, help correct serious means of egress deficiencies in existing buildings and are helpful to fire department rescue and fire fighting efforts.

Authorities having jurisdiction may wish to impose additional requirements because of climate. In conditions such as snow and ice, the effective use of fire escape stairs may be seriously impaired. In such a case, for example, exit capacity credit for the fire escape stairs could be reduced.

A-5-2.8.7 Swinging stairs, although superior to fire escape ladders, are generally unsatisfactory for even emergency use. Although they are permitted by this *Code*, they should not be used when it is reasonably possible to terminate the fire escape stair at the ground.

A-5-2.8.7.9 A latch is desirable to hold swinging stairs down after they have swung to the ground.

A-5-3.1.2 The normal designed occupancy load is not necessarily a suitable criterion, as the greatest hazard may occur when an unusual crowd is present, a condition often difficult for authorities having jurisdiction to control by regulatory measures. The principle of this *Code* is to provide exits for the

maximum probable number of occupants, rather than to attempt to limit the number of occupants to a figure commensurate with available exits; there are, however, limits of occupancy specified in certain special cases for other reasons.

The following table represents a compilation of the occupant load factors specified by the individual occupancies of Chapters 8 through 30.

These figures, based on counts of typical buildings, represent the average maximum density of occupancy.

Occupant Load Factors

Use	Sq Ft	Sq M
Assembly		
Less concentrated use without fixed seating	15 net	1.4
Concentrated use without fixed seating	7 net	.65
Waiting space	3 net	.28
Library — stack areas	100 net	9.3
Library — reading areas	50 net	4.6
Mercantile		
Street floor and sales basement	30 gross	2.8
Multiple street floors — each	40 gross	3.7
Other floors	60 gross	5.6
Storage, shipping	300 gross	27.9
Malls	See 24-1.7.1	
Educational		
Classroom area	20 net	1.9
Shops and other vocational areas	50 net	4.6
Day-care centers	35 net	3.3
Business (offices), industrial	100 gross	9.3
Hotel and apartment	200 gross	18.6
Health care		
Sleeping departments	120 gross	11.1
Inpatient treatment departments	240 gross	22.3
Detention and correctional	120 gross	11.1

A-5-3.2 For further information on stair capacity, see Appendix D.

A-5-3.2.2 Handrails, at approximately waist height, do not actually restrict the effective width of exits. Door jambs, while actually restricting the width, due perhaps to psychological factors, do not appear to have any significant effect on the utilization of exits. This may be because everyone uses doors and is accustomed to the slight reduction in width of the path of travel at the point of passing through a doorway, and instinctively turns or squeezes through in a way which would not occur in the case of a narrow stairway or passage where the feeling of restricted space might be conductive to panic under fire conditions.

Any projection, radiator, pipe, or other object that extends into a corridor, irrespective of width, is undesirable, particularly where large crowds must be accommodated.

A-5-4.1.1 This *Code* generally requires at least two exits, but specifies conditions where one means of egress is all that can reasonably be required in the interest of public safety.

A-5-5.1.3 In new construction if two exits or exit access doors are required they should be placed a distance apart equal to not less than ½ the length of the maximum overall diagonal dimension of the building or area to be served, measured in a straight line between exits (*see Figures A-5-5.1.3 (a) through (e)*). Where exit enclosures are provided as the required exits and are interconnected by a corridor conforming to the requirements of 5-1.3.3, exit separation may be measured along the line of travel within the corridor.

In new construction when more than two exits or exit access doors are required, at least two of the required exits or exit access doors should be so arranged to comply with the above. The other exits or exit access doors must be so located that if one becomes blocked the others will be available.

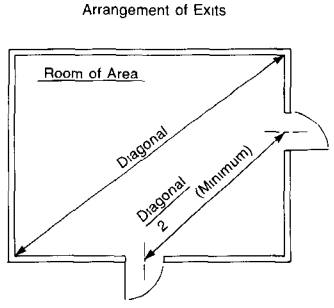
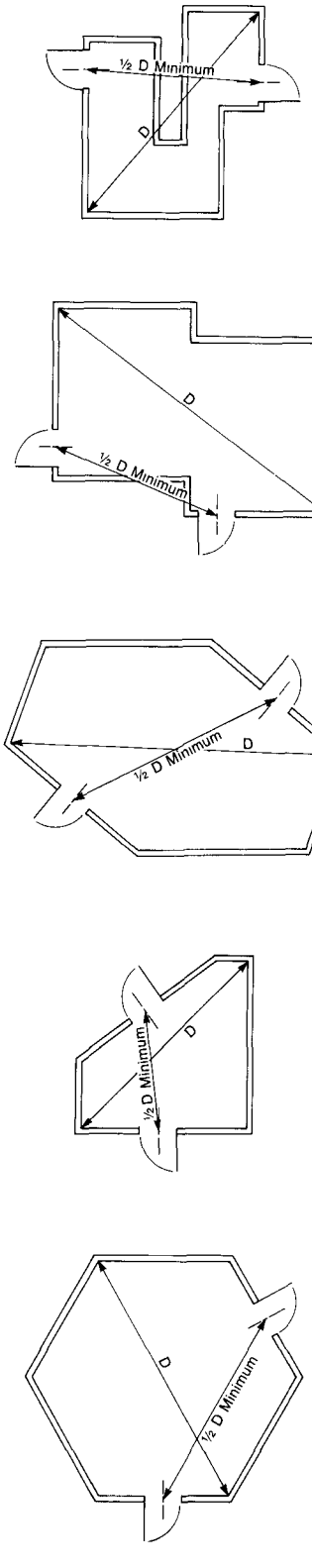


Figure A-5-5.1.3(a)

Arrangement of Exits



(Not to Scale)

Figure A-5-5.1.3(b)

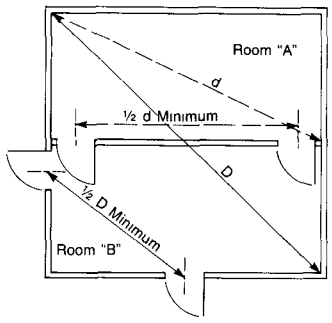


Figure A-5-5.1.3(c)

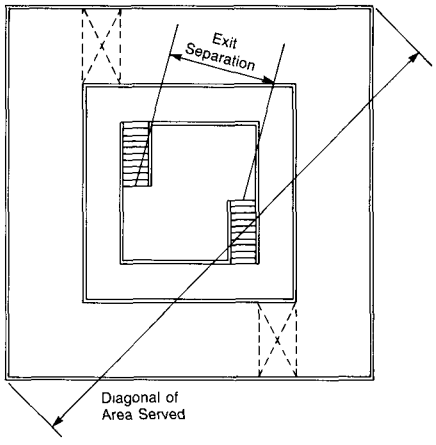


Figure A-5-5.1.3(d)

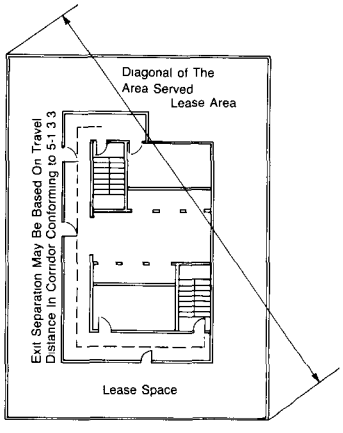


Figure A-5-5.1.3(e)

A-5-5.1.4 Attention is called to the fact that it is difficult in actual practice to construct scissor stairs so that products of combustion having 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 this paragraph. The user's attention is directed to the definitions in Chapter 3 of "noncombustible" and "limited-combustible."

A-5-5.1.5 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 when 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. Figure A-5-5.1.5(a) is an example of a common path of travel.

While a dead end is similar, a dead end may occur where there is no path of travel from an occupied space, but where an occupant may enter a corridor or space thinking there is an exit at the end and, finding none, must retrace his or her path to again reach a choice of exits. Figure A-5-5.1.5(b) is an example of such a dead-end arrangement.

Combining the two concepts, Figure A-5-5.1.5(c) 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 5-6 of the *Code*. Because the room in Figure A-5-5.1.5(d) is occupied by more than six persons, measurement is made 1 ft (30.5 cm) from the most remote point in the room 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 provides the choice of two different paths to remote exits, this is common path of travel. The distance 1 ft (30.5 cm) from the wall at Point B along the centerline of the corridor to Point C is a dead end. If the room had been occupied by six or fewer persons, then the common path of travel would have been measured starting from the door to the room.

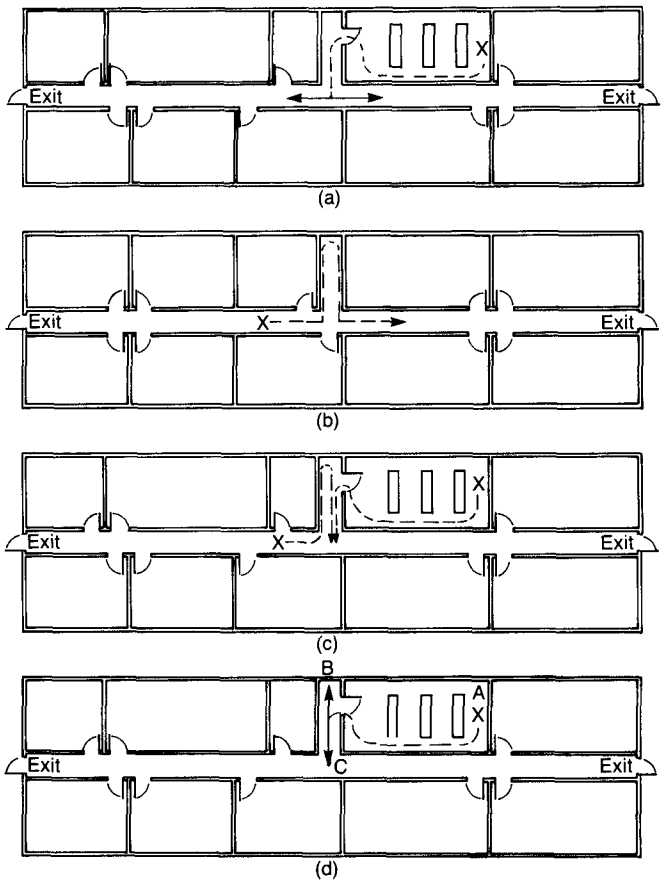


Figure A-5-5.1.5

A-5-5.2.2 Doors which lead through wall paneling and which harmonize in appearance with the rest of the wall so as to avoid detracting from some desired aesthetic or decorative effect are not acceptable, as casual occupants may not be aware of such exits even though actually visible.

A-5-6.1 Table A-5-6.1 is a compilation of the requirements of the individual occupancy chapters (Chapters 8 through 30) for length of dead-end corridors and permissible travel distance to at least one of the required exits.

A dead end occurs when a hallway or other space is so arranged that a person therein is able to travel in one direction only in order to reach any of the exits. Although relatively short dead ends are permitted by this *Code*, it is better practice to eliminate them whenever 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. This 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.

Table A-5-6.1 Exit Travel Distance and Dead-End Limits (By Occupancy)

Type of Occupancy	Dead-End Limit (ft)	Travel Limit to an Exit	
		Unsprinklered (ft)	Sprinklered (ft)
ASSEMBLY			
NEW	20[a] (6.1 m)	150 (45 m)	200 (60 m)
EXISTING	20[a] (6.1 m)	150 (45 m)	200 (60 m)
EDUCATIONAL			
NEW	20 (6.1 m)	150 (45 m)	200 (60 m)
EXISTING	20 (6.1 m)	150 (45 m)	200 (60 m)
NEW DAY-CARE CENTER	N.R.[b]	100[c] (30 m)	150[c] (45m)
EXISTING DAY-CARE CENTER	N.R.[b]	100[c] (30 m)	150[c] (45 m)
HEALTH CARE			
NEW	30 (9.1 m)	100[c] (30 m)	150[c] (45 m)
EXISTING	N.R.[b]	100[c] (30 m)	150[c] (45 m)
NEW AMBULATORY CENTER	20[d] (6.1 m)	100[c] (30 m)	150[c] (45 m)
EXISTING AMBULATORY CENTER	50 (15 m)	100[c] (30 m)	150[c] (45 m)
DETENTION AND CORRECTION			
NEW			
Use Conditions			
II, III, IV	50 (15 m)	100[c] (30 m)	150[c] (45 m)
V	20 (6.1 m)	100[c] (30 m)	150[c] (45 m)
EXISTING			
Use Conditions			
II, III, IV, V	N.R.[b]	100[c] (30 m)	150[c] (45 m)
RESIDENTIAL			
A. Hotels & Dormitories			
NEW	35 (10.7 m)	100[c,e] (30 m)	150[c,e] (45 m)
EXISTING	35 (10.7 m)	100[c,e] (30 m)	150[c,e] (45 m)
B. Apartments			
NEW	35 (10.7 m)	100[c,f] (30 m)	150[c,f] (45 m)
EXISTING	35 (10.7 m)	100[c,f] (30 m)	150[c,f] (45 m)
C. Board and Care	[g]	[g]	[g]
D. Lodging or Rooming Houses, 1- & 2-Family Dwellings	N.R.[b]	N.R.[b]	N.R.[b]
MERCANTILE			
Class A, B & C			
NEW	20[d] (6.1 m)	100 (30 m)	150 (45 m)
EXISTING	50 (15 m)	100 (30 m)	150 (45 m)
Open Air	0	N.R.[b]	N.R.[b]
Covered Mall			
NEW	20 (6.1 m)	100 (30 m)	350[c,h] (106 m)
EXISTING	50 (15 m)	100 (30 m)	350[c,h] (106 m)
BUSINESS			
NEW	20[d] (6.1 m)	200 (60 m)	300 (91 m)
EXISTING	50 (15 m)	200 (60 m)	300 (91 m)
INDUSTRIAL			
A. General, and			
B. Special Purpose	50 (15 m)	100 (30 m)	150[i] (45 m)
C. High Hazard	0	75 (23 m)	75 (23 m)
D. Open Structures	N.R.[b]	N.R.[b]	N.R.[b]

[a] In arena and thrust stage theaters dead-end aisles at the stage must not exceed five rows beyond cross aisle.
[b] No requirement or not applicable.
[c] This dimension is from the room exit access door to the exit, for travel distance within the room, or total travel distance see the appropriate occupancy chapter.
[d] In sprinklered facilities 50 ft (15 m).
[e] See Chapters 16 and 17 for exceptions.
[f] See Chapters 18 and 19 for exceptions.
[g] See Chapter 21.
[h] See Chapters 24 and 25 for exceptions and special considerations.
[i] See Chapter 28 for special considerations.
[j] See Chapter 29 for special requirements.

(*Table continued on p. 186.*)

Table A-5-6.1 Exit Travel Distance and Dead-End Limits (By Occupancy) (Continued)

Type of Occupancy	Dead-End Limit (ft)	Travel Limit to an Exit	
		Unsprinklered (ft)	Sprinklered (ft)
STORAGE			
Low Hazard	N.R.[b]	N.R.[b]	N.R.[b]
Ordinary Hazard	N.R.[b]	200 (60 m)	400 (122 m)
High Hazard	0	75 (23 m)	100 (30 m)
Parking Garages, Open	50 (15 m)	200 (60 m)	300 (91 m)
Parking Garages, Enclosed	50 (15 m)	150 (45 m)	200 (60 m)
Aircraft Hangars, Ground Floor	50[j] (15 m)	Varies[j]	Varies[j]
Aircraft Hangars, Mezzanine Floor	50[j] (15 m)	75 (23 m)	75 (23 m)
Grain Elevators	[j]	200[j] (60 m)	400[j] (122 m)
Miscellaneous Occupancies, Towers, Piers & Water Surrounded Structures, Vehicles & Vessels & Emergency Shelters	50 (15 m)	100 (30 m)	150 (45 m)

[a] In arena and thrust stage theaters dead-end aisles at the stage must not exceed five rows beyond cross aisle.
[b] No requirement or not applicable.
[c] This dimension is from the room exit access door to the exit, for travel distance within the room, or total travel distance see the appropriate occupancy chapter.
[d] In sprinklered facilities 50 ft (15 m).
[e] See Chapters 16 and 17 for exceptions.
[f] See Chapters 18 and 19 for exceptions.
[g] See Chapter 21.
[h] See Chapters 24 and 25 for exceptions and special considerations.
[i] See Chapter 28 for special considerations.
[j] See Chapter 29 for special requirements.

A-5-6.2 The natural exit access (path of travel) will be influenced by the contents and occupancy of the building. Furniture, fixtures, machinery, or storage may serve to increase the length of travel. It is good practice in building design to recognize this by spacing exits at closer intervals than would be needed for a completely open floor area, thus reducing the hazard of excessive travel distances due to introduction of furniture, fixtures, machinery, or storage, and minimizing the danger of violation of the travel distance requirements of this *Code*.

A-5-7.1 An exit from the upper stories, in which the directon of exit travel is generally downward, should not be arranged so that it is necessary to change over 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 permissible in the case of stairs used in connection with overhead or underfloor exit passageways which 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 may properly be prohibited by the authority having jurisdiction under this rule unless some alternate way of travel to another street is available.

A-5-8.1.1 For further information on illumination, see the following publications of the Illuminating Engineering Society:

ANSI/IES RP1, *Practice for Office Lighting* (*see Appendix B*)

IES RP2, *Recommended Practice for Lighting Merchandising Areas* (*see Appendix B*)

ANSI/IES RP3, *Guide for School Lighting* (*see Appendix B*)

ANSI/IES RP7, *Practice for Industrial Lighting* (*see Appendix B*).

A-5-8.1.3 A desirable form of means of egress lighting is by lights recessed in walls about a foot (30.5 cm) above the floor. Such lights are not likely to be obscured by smoke.

A-5-9.2.2 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, refer to NFPA 70, *National Electrical Code* (*see Appendix B*).

A-5-9.2.3 When approved by the authority having jurisdiction, this requirement may be met by means such as:

(a) Two separate electric lighting systems with independent wiring, each adequate alone to provide the specified lighting, one 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 being 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 so arranged that on the failure of one the other will come automatically and immediately into operation. One such source shall 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 battery shall also be so provided with automatic controls that after the battery comes into operation, due to failure of the primary power source or to turning off the primary electric source for the lights, it 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 again turned on.

(c) Electric battery-operated emergency lighting systems, where permitted, complying with the provisions of 5-9.2.2, and operating on a separate circuit and at a voltage different from that of the primary light. Refer to NFPA 70, *National Electrical Code* (*see Appendix B*).

These requirements are not intended to prohibit the connection of a feeder serving exit lighting and similar emergency functions ahead of the service disconnecting means, but such provision does not constitute an acceptable alternate source of power. It furnishes only supplementary protection for emergency electrical functions, particularly when intended to permit 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.

A-5-10.1.1 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 upon the need for signs. In any place of assembly, 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 semi-permanent occupancy by the same people, such as an apartment house where the residents may be presumed to be familiar with exit facilities by reason of regular use thereof. Even in a permanent residence type of building, however, there is need for signs to identify exit facilities such as outside stairs which 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 may be debatable. In cases of doubt, however, it is desirable to be on the safe side by providing signs, particularly as the placing of 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 may be illustrated as follows:

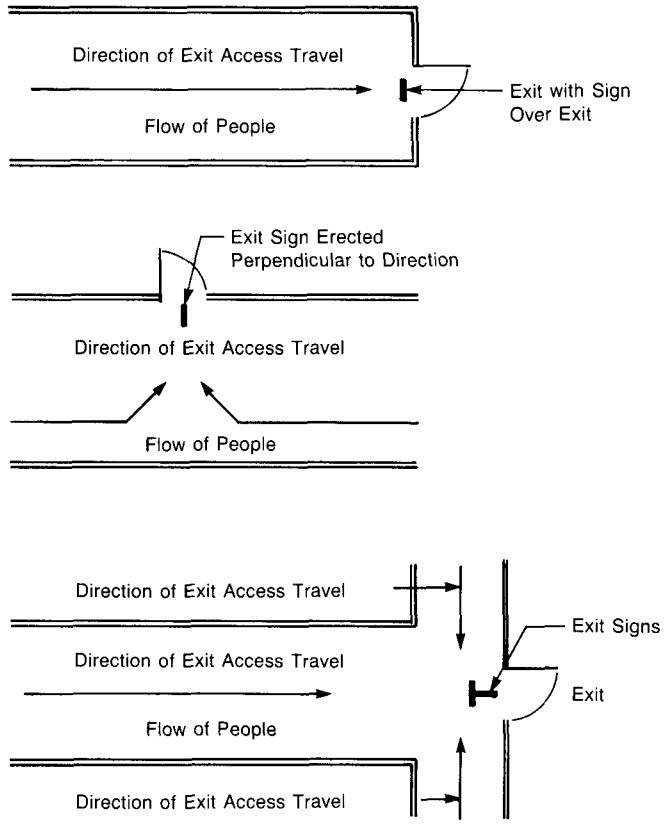


Figure A-5-10.1.1

A-5-10.1.4 In stores, for example, an otherwise adequate exit sign may be made inconspicuous by some high-intensity illuminated advertising sign 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 was made that green be the color for exit signs, following the idea of traffic lights where 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 persisted. In 1949, the Fire Marshals Association of North America voted to request that red be restored as the required exit sign color, as they found that the provision for green involved difficulties in law enactment out of proportion to the importance of the subject. The 10th Edition of the *Code* accordingly 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 may be some situations where some color other than red or green may actually provide better visibility.

A-5-10.3.1 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.

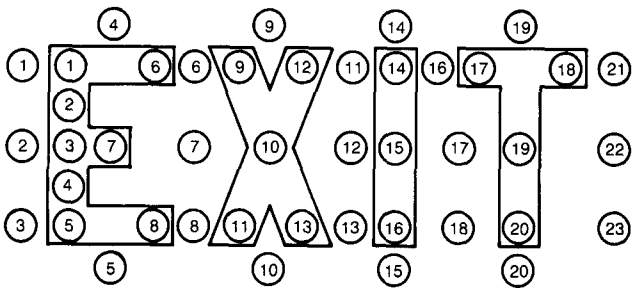
A-5-10.3.2 Colors providing a good contrast are red or green letters on matte white background. Glossy background and glossy letter colors should be avoided.

A-5-10.3.3 The average luminance of the letters and background shall each be measured in footlamberts. The contrast ratio shall be computed from these measurements by the formula:

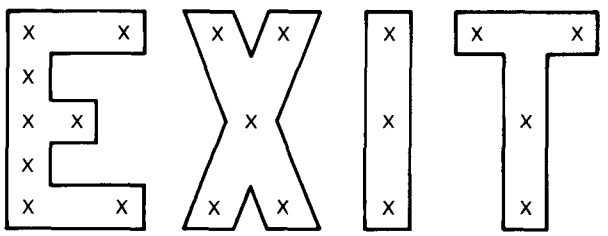
$$\text{Contrast} = \frac{\text{Lg-Le}}{\text{Lg}}$$

the greater luminance and Le

Where Lg is the greater luminance and Le is the lesser luminance, either the variable Lg or Le may represent the letters and the remaining variable the background. The average luminance of the letters and background may be computed by measuring the luminance at the positions indicated in the diagram by numbered spots.



A-5-10.3.3 Exception No. 2 The luminance of these signs is determined by measuring the luminance of circular areas, no greater than ⅜ in. (1.0 cm) in diameter, at the positions indicated in the diagram by Xs.



Self-luminous signs are illuminated by self-contained power sources and operate independently of external power sources. Batteries do not qualify as a self-contained power source under this definition.

A-5-10.3.5 Exception The flashing repetition rate should be approximately one cycle per second and the duration of the off-time should not exceed one quarter second per cycle. During on-time, the illumination levels must be provided in accordance with 5-10.3.2 or 5-10.3.3. Flashing signs when activated with the fire alarm system may be of assistance.

A-5-10.4.2.1 The likelihood of mistaking for exit doors passageways or stairways which lead to dead-end spaces where occupants might be trapped depends upon the same considerations as govern the need for exit signs. Thus, such areas should be marked with a sign reading NO EXIT. Supplementary lettering indicating the character of the area such as TO BASEMENT, STOREROOM, LINEN CLOSET, or the like may be provided.

A-5-11.1 Seventy-five ft (23 m) can be traversed in approximately 10 to 15 seconds, even allowing for some momentary delay in decision as to which way to go, during which it may be assumed that a normal individual can hold his or her breath.

CHAPTER 6

A-6-2.1 Table A-6-2.1 on page 189 is a reprint of Table 3 from NFPA 220, *Standard on Types of Building Construction* (*see Appendix B*). This is included for the convenience of users of the *Life Safety Code*.

A-6-2.2.2 To ensure that a fire barrier is continuous, it is necessary to completely seal all openings where the fire barrier abuts other fire barriers, exterior walls, the floor below, and the floor or ceiling above. In the Exception, the fire resistance rating of the bottom of the interstitial space must be provided by that membrane in and of itself. Ceilings of rated floor/ceiling and roof/ceiling assemblies do not necessarily provide the required fire resistance.

A-6-2.2.3.2 Expansion joints (control joints) and seismic joints are vertical openings.

A-6-2.2.3.3 The application of the 2-hour rule, in buildings not divided into stories, may be based on the number of levels of platforms or walkways served by the stairs.

A-6-2.2.3.5 When 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.

A-6-2.2.3.5(a) As some atriums may be of other than square or rectangular shape, the 20 ft (6.1 m) measurement obviously cannot be applied where the corners exist. This would necessitate that the designer and the authority having jurisdiction work out equivalent life safety.

A-6-2.2.3.5(f) Exception The following information gives guidance for the smoke removal system which may be used in lieu of an engineered smoke control system:

A mechanical exhaust system at the top of the atrium arranged so that the space does not become pressurized.

(1) In atriums 55 ft (17 m) or less in height with a volume of 600,000 cu ft (17,000 cu m) or less, the system should exhaust 40,000 cfm (19 cu m/s) or six air changes per hour, whichever is greater. Gravity supply inlets should be provided at the lowest level of the atrium and be sized for 75 percent of the exhaust.

(2) In atriums 55 ft (17 m) or less in height with a volume in excess of 600,000 cu ft (17,000 cu m), the system should be sized to provide a minimum of four air changes per hour. Gravity supply inlets should be provided at the lowest level of the atrium and be sized for 75 percent of the exhaust.

(3) In atriums in excess of 55 ft (17 m) in height (regardless of volume) the exhaust system should be sized to provide a minimum of four air changes per hour. Supply air should be mechanically introduced from near the bottom of the atrium and should be directed vertically toward the top of the atrium at a rate of approximately 75 percent of the exhaust.

Table A-6-2.1 Fire Resistance Requirements 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[1]	2	2	2	1	0[1]
Supporting one floor only	4	3	2	1	0[1]	2	2	2	1	0[1]
Supporting a roof only	4	3	1	1	0[1]	2	2	2	1	0[1]
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, bearing walls or other columns	4	3	2	1	0	1	0	H[2]	1	0
Supporting one floor only	3	2	2	1	0	1	0	H[2]	1	0
Supporting a roof only	3	2	1	1	0	1	0	H[2]	1	0
BEAMS, GIRDERS, TRUSSES & ARCHES —										
Supporting more than one floor, bearing walls or columns	4	3	2	1	0	1	0	H[2]	1	0
Supporting one floor only	3	2	2	1	0	1	0	H[2]	1	0
Supporting a roof only	3	2	1	1	0	1	0	H[2]	1	0
FLOOR CONSTRUCTION	3	2	2	1	0	1	0	H[2]	1	0
ROOF CONSTRUCTION	2	1½	1	1	0	1	0	H[2]	1	0
EXTERIOR NONBEARING WALLS	0[1]	0[1]	0[1]	0[1]	0[1]	0[1]	0[1]	0[1]	0[1]	0[1]

▨ Those members listed that are permitted to be of approved combustible material.

[1] 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. They need to be specified in other standards and codes, where appropriate, and may be required in addition to the requirements of this Standard for the construction type.

[2] "H" indicates heavy timber members; see text for requirements.

For additional information see: Butcher and Parnell, *Smoke Control in Fire Safety Design* (*see Appendix B*); and A-15-3.1.3.

Volume Determination. The volume of an atrium is determined by calculating all the space having a common atmosphere. The presence of a fire barrier with protected openings, whether developed by fire barriers or specially designed glass walls with special sprinkler protection, is intended to provide the limits of the common atmosphere.

A-6-2.2.3.5(g) 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-6-2.2.5 Longer ratings may be required where doors are provided for property protection as well as life safety.

NFPA 80, *Standard for Fire Doors and Windows* (*see Appendix B*), may be consulted for standard practice in the selection and installation of fire doors.

In existing installations only, a 1¾-in. (4.4-cm) solid bonded wood core door has been considered a satisfactory substitute for a door with a 20-minute fire protection rating.

A-6-2.2.7 In engineered smoke management systems, the designer should consider the use of high temperature links on fire dampers where air handling ductwork penetrates fire barriers.

A-6-2.2.8(c) See NFPA 90A, *Standard for the Installation of Air Conditioning and Ventilating Systems* (*see Appendix B*) for additional information on air handling duct work passing through fire barriers.

A-6-2.3.1 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 firestopping materials.

A-6-3.1 Whenever smoke barriers and doors therein require a degree of fire resistance as may be specified by requirements in the various occupancy chapters (Chapters 8 through 30), the construction is more appropriately a fire barrier which has been defined: "to limit the spread of fire and restrict the movement of smoke." (*See 6-2.2.5 and 6-2.2.6.*)

A-6-3.2 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.

A-6-3.3.1 The clearance for proper operation of smoke doors has been defined as ⅛ in. (0.3 cm).

A-6-3.3.2 In existing installations only, a 1¾-in. (4.4-cm) solid bonded wood core door has been considered a satisfactory substitute for a door with a 20-minute fire protection rating.

A-6-3.3.3 When, because of operational necessity, it is desired to have smoke barrier doors normally open, such doors should be provided with hold-open devices which are activated to close the doors by the operation of smoke detectors and other alarm functions.

A-6-4.1 A hazardous operation or process may be conducted in a detached structure sufficiently remote from other buildings to avoid any danger to occupants of other buildings.

A-6-4.2 For details, see NFPA 68, *Guide for Explosion Venting* (*see Appendix B*).

A-6-5.1.1 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. Furnishings, which in some cases may be secured in place for functional reasons, should not be considered as interior finish.

A-6-5.1.2 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. The use in recent years of many new finishes and soft floor coverings of unknown fire characteristics and the fire record of some of these indicate that the authority having jurisdiction should request test information on any floor finish or floor covering having fire characteristics with which he or she is not familiar.

A-6-5.1.3 Cellular or foamed plastics material means a heterogeneous system comprised of at least two phases, one of which is a continuous polymeric organic material, and a second of which is deliberately introduced for the purpose of distributing gas in voids throughout the material, and 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-6-5.2.1 Where fuel contributed as well as flame spread and smoke developed are recorded in the results of a test conducted in accordance with NFPA 255, *Method of Test of Surface Burning Characteristics of Building Materials* (*see Appendix B*), there is not necessarily a direct relationship between these three measurements and it is not the intent to establish a classification for fuel contributed.

A-6-5.2.2 Some interior finish materials, such as fabrics not applied to a solid backing, may not lend themselves to a test made in accordance with NFPA 255, *Method of Test of Surface Burning Characteristics of Building Materials* (*see Appendix B*). In these cases the large-scale test outlined in NFPA 701, *Standard Methods of Fire Tests for Flame-Resistant Textiles and Films* (*see Appendix B*), may be used.

A-6-5.2.3 The character of smoke and other products of decomposition includes the properties of obscuration, toxicity, and irritability.

A-6-5.2.4 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 refer to NFPA 255, *Method of Test of Surface Burning Characteristics of Building Materials.*

A-6-5.3.2 The flooring radiant panel provides a measure of a floor covering's tendency to spread flames when 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 providing it can be shown that the floor covering is at least as resistant to spread of flame as a material which will meet the federal flammability standard, FF1-70, *Standard for the Surface Flammability of Carpets and Rugs (Pill Test).* 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 exitways and corridors.

It has not been found necessary or practical to regulate interior floor finishes on the basis of smoke development.

A-6-5.7 The following is a compilation of the interior finish requirements of the occupancy chapters of the *Code.*

Occupancy	Exits	Access to Exits	Other Spaces
Assembly — New***			
Class A or B	A	A or B	A or B
Class C	A	A or B	A, B, or C
Assembly — Existing***			
Class A or B	A	A or B	A or B
Class C	A	A or B	A, B, or C
Educational — New***	A	A or B	A or B C on movable 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
Day-Care Centers—Existing	A or B	A or B	A or B
Group Day-Care Homes	A or B	A, B, or C	A, B, or C
Family Day-Care Homes	A or B	A or B	A, B, or C
Health Care — New	A	A B lower portion of corridor wall*	A B in small individual rooms
	I	I	
Health Care — Existing	A or B	A or B	A or B
Detention & Correctional — New*	A I	A I	A, B, or C
Detention & Correctional — Existing*	A or B I or II	A or B I or II	A, B, or C
Residential, hotels & Dormitories — New	A I or II	A or B I or II	A, B, or C
Residential, hotels & Dormitories — Existing*	A or B I or II	A or B I or II	A, B, or C
Residential, apartment buildings — New	A I or II	A or B I or II	A, B, or C
Residential, apartment buildings — Existing	A or B I or II	A or B I or II	A, B, or C
Residential, Board and Care — See Chapter 21			
Residential, 1- and 2-family, lodging or rooming houses	A, B, or C	A, B, or C	A, B, or C
Mercantile — New***	A or B	A or B	A or B
Mercantile — Existing Class A or B***	A or B	A or B	ceilings — A or B existing on walls — A, B, or C
Mercantile — Existing Class C***	A, B, or C	A, B, or C	A, B, or C
Office — New and 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
Unusual Structures**	A or B	A, B, or C	A, B, or C

*See Chapters for details.
**See Section 30-1 for occupancy classification.
***Exposed portions of structural members complying with the requirements for heavy timber construction may be permitted.
Notes:
Class A Interior Finish — flame spread 0-25, smoke developed 0-450.
Class B Interior Finish — flame spread 26-75, smoke developed 0-450.
Class C Interior Finish — flame spread 76-200, smoke developed 0-450.
Class I Interior Floor Finish — minimum 0.45 watts per sq cm.
Class II Interior Floor Finish — minimum 0.22 watts per sq cm.
Automatic Sprinklers — where a complete standard system of automatic sprinklers is installed, interior finish with flame spread rating not over Class C may be used in any location where Class B is normally specified and with rating of Class B in any location where Class A is normally specified; similarly, Class II interior floor finish may be used in any location where Class I is normally specified and no critical radiant flux rating is required where Class II is normally specified.

CHAPTER 7

A-7-3.1 For guidance on designing and installing engineered smoke control systems see:

(1) NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems* (*see Appendix B*).

(2) *Smoke Control in Fire Safety Design*, NFPA SPP-53, by Butcher and Parnell (*see Appendix B*).

(3) *Design of Smoke Control Systems for Buildings*, by Klote and Fothergill (*see Appendix B*).

(4) NFPA *Fire Protection Handbook* — Fifteenth Edition, Section 7, Chapter 4 including Bibliography (*see Appendix B*).

(5) In existing detention and correctional occupancies, also see A-15-3.1.3.

A-7-4.1 Under certain limited conditions elevators have been recognized as required exits by prior editions of this *Code*. No such credit is given in this edition due to some characteristics which make them unsuitable for emergency exit use.

The use of elevators for emergency evacuation purposes when operated by trained emergency service personnel (building personnel, fire personnel, etc.) in accordance with ANSI/ASME A17.1, *Safety Code for Elevators, Dumbwaiters, Escalators, and Moving Walks* (*see Appendix B*), Rule 211.3 should be utilized in the building evacuation program.

In high-rise buildings, towers or in deep underground spaces where travel over considerable vertical distance on stairs may cause persons not capable of such physical effort to collapse before they reach the street exit, stairways may be used for initial escape from the immediate area of danger and elevators used to complete the travel to the street.

It reasonably may be assumed that in all buildings of sufficient height to indicate the need for elevators, they will be provided for normal use and for this reason no requirements for mandatory installation of elevators are included in the *Code*.

A-7-6.1.2 Some of the provisions of this section are excerpted from NFPA 72A, *Standard for the Installation, Maintenance, and Use of Local Protective Signaling Systems* (*see Appendix B*). For purposes of this *Code*, some provisions of this section are more stringent than those of NFPA 72A. NFPA 72A should be consulted for additional details.

A-7-6.2.7 A living unit is that structure, area, room, or combination of rooms, including hotel rooms/suites, in which a family or individual lives. This is meant to cover living areas only and not common usage areas in multifamily buildings such as corridors, lobbies, basements, etc.

A-7-6.3.2 When coded stations are used and more than one station is operated, at least three complete rounds of a clear coded signal should be transmitted.

A-7-6.4 The selection of the means of fire department notification should be the most reliable depending on local conditions and should be determined in consultation with the authority having jurisdiction.

A-7-6.5.5 Control devices that operate on loss of power to the actuator may be considered self-monitoring for integrity.

A-7-7.1.1 For a discussion of the effectiveness of automatic sprinklers as well as a general discussion on automatic sprinklers, see Section 17, Chapter 1, of the Fifteenth Edition of the NFPA *Fire Protection Handbook* (*see Appendix B*).

A-7-7.1.3 Properly designed automatic sprinkler systems provide the dual function of both automatic alarms and automatic extinguishment.

The preceding is not true 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-7-7.1.4 Standard automatic sprinkler protection provides a high degree of life safety from fire. This *Code*, however, does not rely on any one feature as the sole safeguard for life, and specifies other additional safeguards in recognition of the fact that automatic sprinkler systems may in rare instances be inoperative.

A-7-7.2.1 NFPA 71, *Standard for the Installation, Maintenance, and Use of Central Station Signaling Systems* (*see Appendix B*), gives details of standard practice in sprinkler supervision.

Subject to the approval of the authority having jurisdiction, sprinkler supervision may also 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 72A, 72B, 72C, and 72D cover such matters. Where municipal fire alarm systems are involved, reference should also be made to NFPA 1221, *Public Fire Service Communications* (*see Appendix B*).

A-7-7.3 Automatic extinguishing systems other than automatic sprinklers are covered by the following NFPA standards:

NFPA 11, *Standard for Low Expansion Foam and Combined Agent Systems* (*see Appendix B*)

NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems* (*see Appendix B*)

NFPA 12A, *Standard on Halon 1301 Fire Extinguishing Systems* (*see Appendix B*)

NFPA 12B, *Standard on Halon 1211 Fire Extinguishing Systems* (*see Appendix B*)

NFPA 15, *Standard for Water Spray Fixed Systems* (*see Appendix B*)

NFPA 17, *Standard on Dry Chemical Extinguishing Systems* (*see Appendix B*).

A-7-7.4.1 For description of standard types of extinguishers and their installation, maintenance, and use, see NFPA 10, *Standard for the Installation of Portable Fire Extinguishers* (*see Appendix B*). The labels of recognized testing laboratories on extinguishers provide evidence of tests indicating reliability and suitability of the extinguisher for its intended use. Many unlabeled extinguishers are offered for sale which are substandard by reason of insufficient extinguishing capacity, questionable reliability, extinguishing agents not effective on fires in ordinary combustible materials, or involving a personal hazard to the user.

CHAPTER 8

A-8-1.2.1 Depending upon the character of construction and the hazard of the occupancy, this will require some physical separation by walls of appropriate fire resistance, protection of the other occupancy by automatic sprinklers, or other appropriate measures. Where the building is of fire-resistive construction and the hazard of the other occupancy is low or moderate, as in a school or hotel, no separation may be necessary.

A-8-1.2.4 Exception Example: An assembly room for the inmates of a detention occupancy will not be subjected to simultaneous occupancy.

A-8-1.3 Definitions.

Platform. It is not intended to prohibit the use of a curtain as a valance to screen or hide the electric conduit, lighting track or similar fixtures.

A-8-2.2 Elevators, slide escapes, and fire escapes are not recognized as constituting required exits in assembly occupancies.

A-8-2.4.3 Paragraph 8-1.2.2 provides that assembly areas with individual occupant load of less than 50 persons in buildings of occupancies other than assembly shall be classed as part of the other occupancy.

A-8-2.5.4 Tablet-arm chairs having a stored position have not been shown to require special regulation. When an assembly occupancy is designed for dual purpose as instructional space and public purposes, management should require that the tablet-arm be placed in the stored position when instruction is not the primary function.

A-8-2.5.5.7 Figure A-8-2.5.5.7 illustrates the requirements of 8-2.5.5.7.

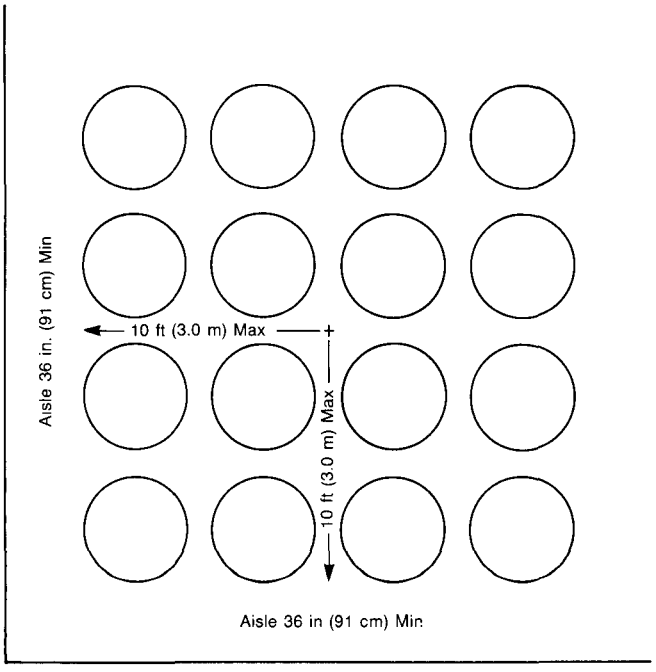


Figure A-8-2.5.5.7

A-8-2.5.5.8 Figure A-8-2.5.5.8 illustrates the requirements of 8-2.5.5.8.

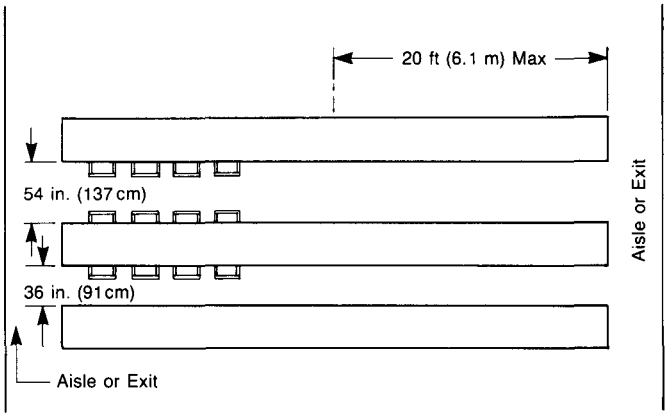


Figure A-8-2.5.5.8

A-8-2.5.5.9 In sizing cross aisles in accordance with 5-3.2 and 8-2.3.1, the movement of the occupants in the seating area is assumed to be evenly divided among the means of egress paths provided.

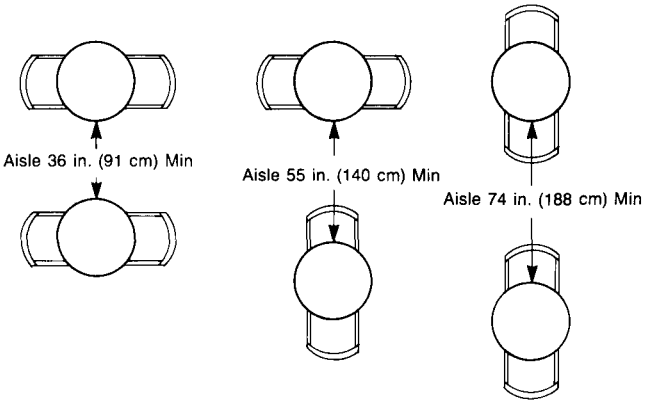
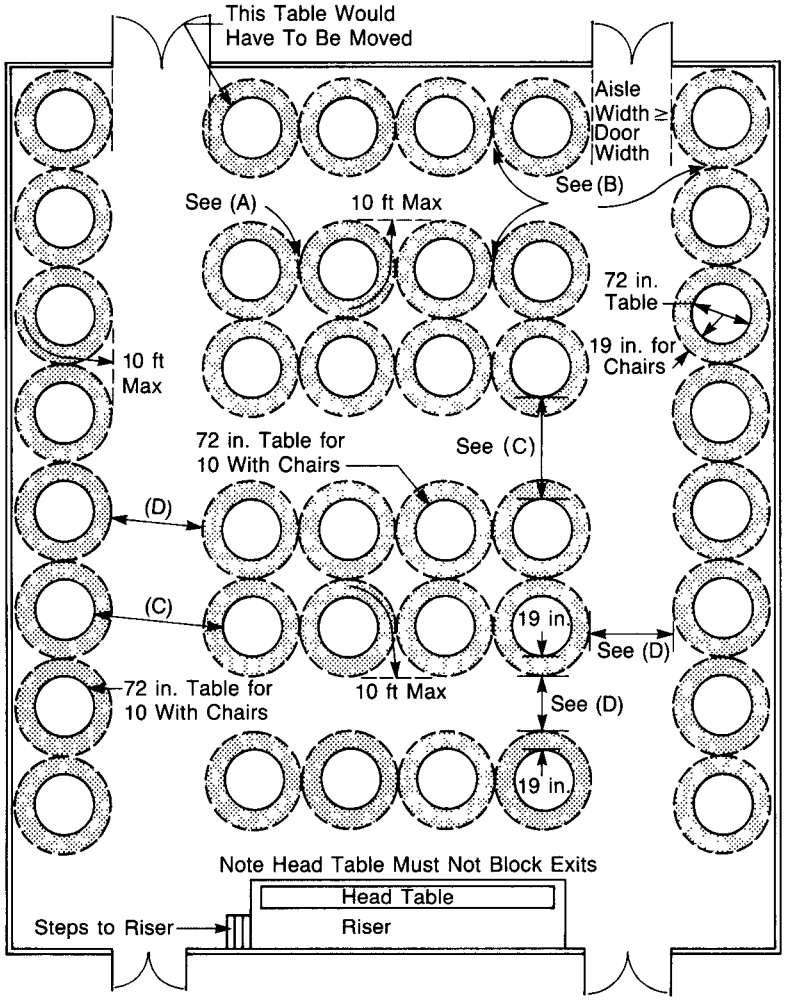


Figure A-8-2.5.5.9(a)

Figure A-8-2.5.5.9(b) illustrates the aisle requirements for a banquet type arrangement. Although not required a reasonable space should be provided between tables for waitress or waiter access, otherwise the tables will gradually be pushed into the aisle width. This diagram illustrates aisle requirements only and would not be used to increase occupant load or approve layout as it does not illustrate realistic layouts for servicing.



(A) A Small Aisle Would Normally Be Provided for Waiter/Waitress Access.

(B) No Aisle Requirement When Travel ≤ 10 ft

(C) Distance Between Table Must Be ≥ Required Aisle Width Plus 19 in. for Chairs on One or 38 in. for Chairs on Both Sides

(D) Aisle Must Be Sized in Accordance with 5-3.2 But Not Less Than 36 in.

Conversion: 1 in. = 2.54 cm.

Figure A-8-2.5.5.9(b)

A-8-2.5.5.10(a) Completely uniform tread dimensions are preferred over aisle stair designs where tread depths alternate between relatively small intermediate treads between seating platforms and relatively larger treads at seating platforms. A larger tread, 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 better than minimum tread depth for the intermediate tread, hence 13 in. (33.0 cm) is specified.

A-8-2.5.5.10(b) Tread depth is more important to stair safety than is riser height. Therefore, in cases where 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 seating area gradient exceeds 8 in 11, it is recommended that the riser height be increased while maintaining a tread depth of at least 11 in. (27.9 cm).

A-8-2.5.5.10(f) See A-5-2.2.6.4. Gaps in center-aisle handrails permit crossovers from one side of an aisle stair to the other side and they should be located at intervals of three to five rows. A minimum clear width of 48 in. (122 cm) between seats is recommended for aisle stairs having center-aisle handrails.

Possible justification for not installing handrails on an aisle stair would be that such handrails are used by less than five percent of people using the aisle stair. This low level of handrails use should not be expected to occur on aisle stairs of even very moderate gradient where flight lengths are unusually large, where there are distracting views in descent or where light conditions are not conducive to tread nosing visibility. Thus, a strong case can be made for handrails in aisle stairs in stadia, arenas, grandstands and theaters on the grounds that safety, egress efficiency, convenience and comfort are significantly improved.

A-8-2.5.5.10(g) Certain tread covering materials such as plush carpets, often used in theaters, produce an inherently well-marked tread nosing under most light conditions. On the other hand, concrete treads (with nosings having a sharp edge), especially under outdoor light conditions, are difficult to discriminate and therefore require an applied marking stripe. Slip resistance of such marking stripes should be similar to the rest of the treads and no tripping hazard should be created.

A-8-3.4.2 "Approved means" required by this paragraph may be of a variety of items depending on the specific circumstances. In smaller assembly occupancies it may be manual stations in accordance with 7-6.2.1(a). In facilities with automatic sprinkler protection it may be water flow in accordance with 7-6.2.1(c), or automatic detection in accordance with 7-6.2.1(b), whereas in large facilities with fire watches it may be special stations or even radios.

A-8-4.4 Unless accommodations are specifically provided for the handicapped, the placement of handicapped persons may endanger the proper use of exits by others by blocking aisles and exits.

CHAPTER 9

A-9-1.2.1 Depending upon the character of construction and the hazard of the occupancy, this will require some physical separation by walls of appropriate fire resistance, protection of the other occupancy by automatic sprinklers, or other appropriate measures. Where the building is of fire-resistive construction and the hazard of the other occupancy is low or moderate, as in a school or hotel, no separation may be necessary.

A-9-1.2.4 Exception Example: An assembly room for the inmates of a detention occupancy will not be subjected to simultaneous occupancy.

A-9-1.3 Definitions.

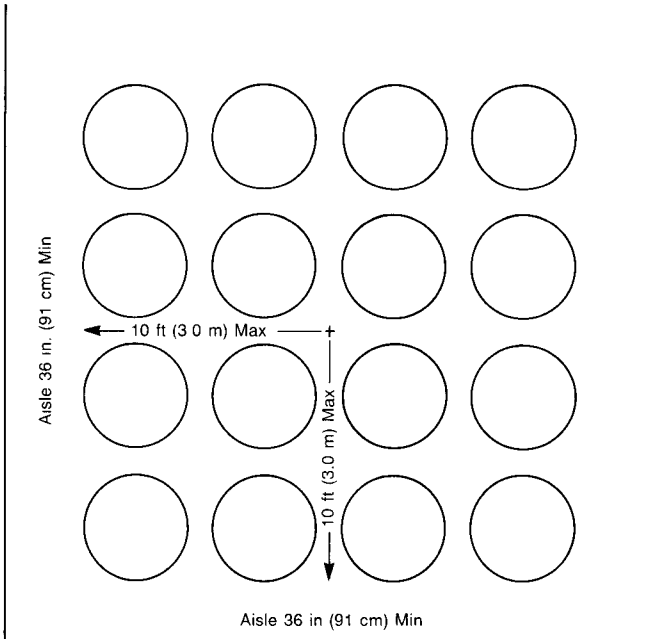
Platform. It is not intended to prohibit the use of a curtain as a valance to screen or hide the electric conduit, lighting track or similar fixtures.

A-9-2.2 Elevators and slide escapes are not recognized as constituting required exits in assembly occupancies.

A-9-2.4.3 Paragraph 9-1.2.2 provides that assembly areas with an individual occupant load of less than 50 persons in buildings of occupancies other than assembly shall be classed as part of the other occupancy.

A-9-2.5.4 Tablet-arm chairs having a stored position have not been shown to require special regulation. When an assembly occupancy is designed for dual purpose as instructional space and public purposes, management should require that the tablet-arm be placed in the stored position when instruction is not the primary function.

A-9-2.5.5.7 Figure A-9-2.5.5.7 illustrates the requirements of 9-2.5.5.7.



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A-9-2.5.5.8 Figure A-9-2.5.5.8 illustrates the requirements of 9-2.5.5.8.

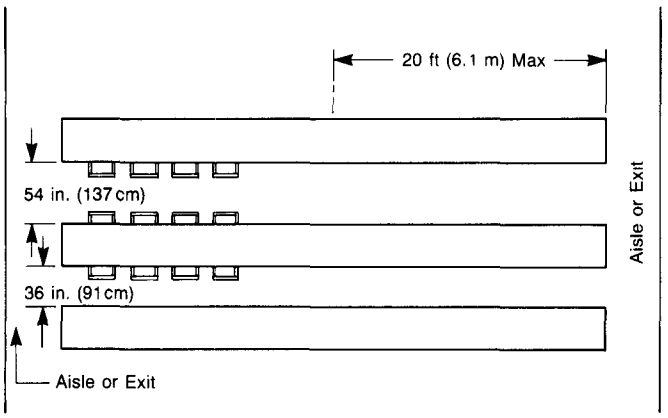


Figure A-9-2.5.5.8

A-9-2.5.5.9 In sizing cross aisles in accordance with 5-3.2 and 8-2.3.1, the movement of the occupants in the seating area is assumed to be evenly divided among the means of egress paths provided.

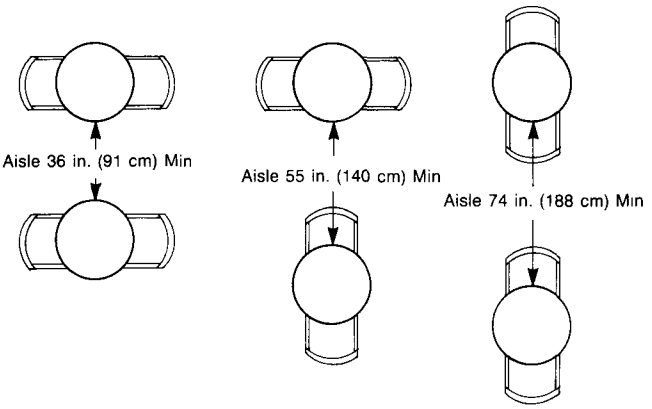
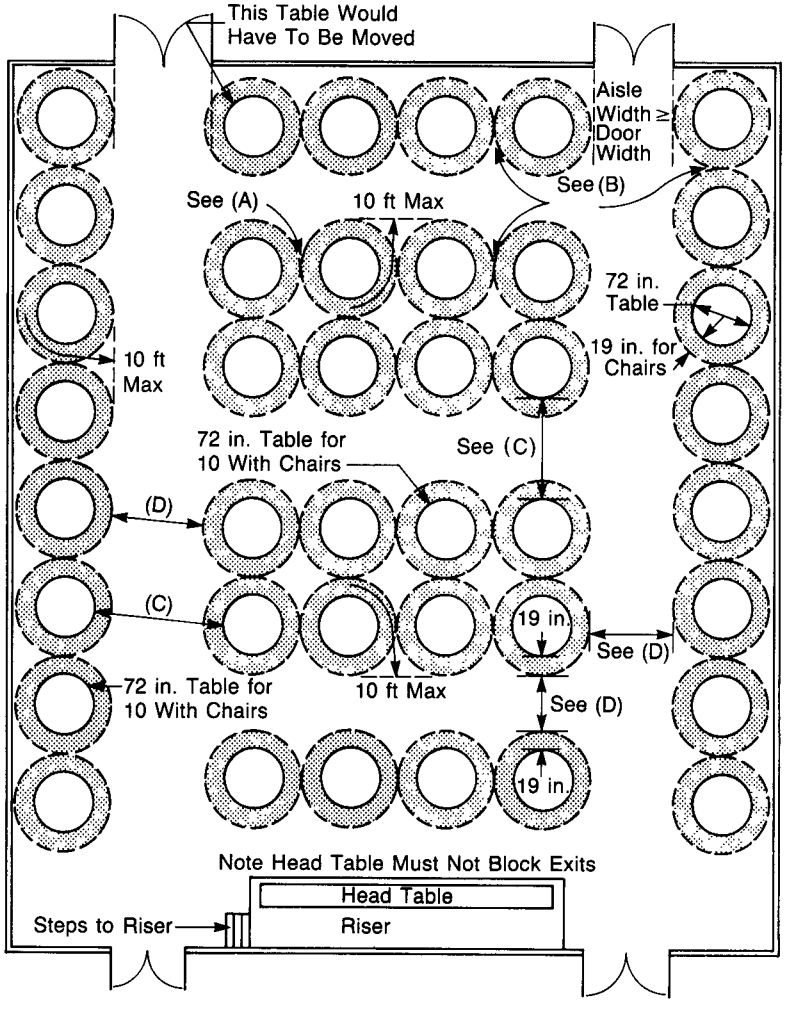


Figure A-9-2.5.5.9(a)

Figure A-9-2.5.5.9(b) illustrates the aisle requirements for a banquet type arrangement. Although not required a reasonable space should be provided between tables for waitress or waiter access, otherwise the tables will gradually be pushed into the aisle width. This diagram illustrates aisle requirements only and would not be used to increase occupant load or approve layout as it does not illustrate realistic layouts for servicing.



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Conversion: 1 in. = 2.54 cm.

Figure A-9-2.5.5.9(b)

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A-9-2.5.5.10(b) Tread depth is more important to stair safety than is riser height. Therefore, in cases where 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 seating area gradient exceeds 8 in 11, it is recommended that the riser height be increased while maintaining a tread depth of at least 11 in. (27.9 cm).

A-9-2.5.5.10(f) See A-5-2.2.6.4. Gaps in center-aisle handrails permit crossovers from one side of an aisle stair to the other side and they should be located at intervals of three to five rows. A minimum clear width of 48 in. (122 cm) between seats is recommended for aisle stairs having center-aisle handrails.

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A-9-2.5.5.10(g) Certain tread covering materials such as plush carpets, often used in theaters, produce an inherently well-marked tread nosing under most light conditions. On the other hand, concrete treads (with nosings having a sharp edge), especially under outdoor light conditions, are difficult to discriminate and therefore require an applied marking stripe. Slip resistance of such marking stripes should be similar to the rest of the treads and no tripping hazard should be created.

A-9-3.4.2 "Approved means" required by this paragraph may be of a variety of items depending on the specific circumstances. In smaller assembly occupancies it may be manual stations in accordance with 7-6.2.1(a). In facilities with automatic sprinkler protection it may be water flow in accordance with 7-6.2.1(c), or automatic detection in accordance with 7-6.2.1(b), whereas in large facilities with fire watches it may be special stations or even radios.

CHAPTER 10

A-10-1.1.3 Reference is made to ANSI A117.1, *American Standard Specifications for Making Buildings and Facilities Accessible to and Usable by the Physically Handicapped* (*see Appendix B*).

A-10-1.4.1 Educational occupancies for students of high school age and below are distinguished from assembly occupancies in that the same occupants are regularly present and they are subject to discipline and control. Sunday schools or church schools which are not used for daily classes throughout the week are considered to fall within the scope of assembly occupancies.

A-10-1.6 Fire-resistive construction is not generally specified in this chapter of the *Code*, though it is obviously desirable and should be used wherever feasible.

Automatic sprinkler protection, herein specified for life safety reasons, provides a substantial degree of protection for the property. Sprinkler protection, to be effective, must be complete and cover all portions of the building. Partial automatic sprinkler systems covering only corridors, stairs, and points of special hazard are effective only when fires start in the protected area; they will not prevent the dangerous spread of smoke from fires starting in areas not protected by automatic sprinklers. In no case is sole reliance placed on automatic sprinklers or on any other single safeguard.

A-10-2.3.2 For example, in the case of enclosed interior stairways, where the capacity of the third floor is such as to require three stairways, and the capacity of the second floor also requires three stairways, the second floor may utilize the stairways also serving the third floor so that the total number of stairways required is three, not six. However, the street floor and basement must have their required exit capacity provided by separate exits or, if the path of exit from the street floor or basement is through a part of the same stair tower serving the upper floors, the total exit capacity must be such as to provide required exit facilities for street floor and basement without encroaching upon the stair capacity required for upper floors. This assumes that because of greater travel distance the occupants of floors above the second will require a longer time to reach the street and will not make simultaneous exit.

A-10-2.5.1 A school plan with outside doors or stairways at both ends of a central corridor meets this requirement. Pockets may be created where stairways are not at the end of corridors but at intermediate points.

A-10-2.5.5.1 School design providing classroom exits directly to the outside or to exterior balconies open to the outside air with exterior stairways available to either direction to grade is considered preferable, from the fire safety standpoint, to the more conventional design using interior corridors which can become untenable from the accumulation of smoke and heat.

A-10-2.9(b) Exception to (b) 2 This does not exempt shops and laboratories.

A-10-2.11.5 It is highly desirable to have all windows of a type which can be readily opened from inside, and to have them large enough and low enough for use by students, teachers, and fire fighters. Windows may serve as a supplementary means of emergency escape, particularly where ladders can be raised by fire fighters or others. Even where the location is such as to preclude the use of windows for escape purposes, they may provide air for breathing in a smoke-filled room while trapped occupants are awaiting rescue. Windows should have sills not too high above the floor.

A-10-3.3.1 Exception NFPA 220, *Standard on Types of Building Construction* (*See Appendix B*) defines Type IV (2HH) construction. (*Also see A-6-2.1.*)

A-10-7.1.1.1 It should be noted that this paragraph does not require the staff ratios indicated, but only states that the requirements of this section are based on these staff ratios. If these staff ratios are not maintained, it would be the responsibility of the authority having jurisdiction to determine what additional safeguards above and beyond the requirements of this section would be necessary. Typical additional provisions may include restricting the day-care center 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 upon the situation.

A-10-7.1.1.2 Day-care centers do not provide for the full-time maintenance of a client. Occupancies which provide primary place of residence are dealt with in other occupancies. See Chapters 16 through 22, "Residential Occupancies."

A-10-7.2.11.1 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 like refrigerators or freezers.

A-10-8 The requirements detailed in Section 10-8, Group Day-Care Homes (less than 13 clients), are based on the minimum staff-to-client ratio of two staff for up to 12 clients with no more than three clients under age two.

A-10-8.1.1.1 Group day-care homes do not provide for the full-time maintenance of a client. Occupancies which provide a primary place of residence are dealt with in other occupancies. See Chapters 16 through 22, "Residential Occupancies."

A-10-8.1.6 Each building used as a group day-care home should meet the local minimum housing code and fire prevention code for the applicable class of residential construction or, if none exists, a nationally recognized model code.

A-10-8.2.11.1 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 like refrigerators or freezers.

A-10-9 The requirements detailed in Section 10-9, Family Day-Care Homes, are based on the minimum staff-to-client ratio of one staff for up to six clients, including the caretaker's own children under age 6, with no more than two children under age 2.

A-10-9.1.1.1 Family day-care homes do not provide for the full-time maintenance of a client. Occupancies which provide a primary place of residence are dealt with in other occupancies. See Chapters 16 through 22, "Residential Occupancies."

A-10-9.1.6 Each building used as a family day-care home should meet the local minimum housing code and fire prevention code for the applicable class of residential construction or, if none exists, a nationally recognized model code.

A-10-9.2.11.2 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 like refrigerators or freezers.

CHAPTER 11

A-11-1.1.1 The provision of additional means of egress, automatic sprinkler protection, area separations, emergency lighting, and other alternate means of protection may be used to provide reasonable life safety from fire and panic.

A-11-1.4.1 Educational occupancies for students of high school age and below are distinguished from assembly occupancies in that the same occupants are regularly present and they are subject to discipline and control. Sunday schools or church schools which are not used for daily classes throughout the week are considered to fall within the scope of assembly occupancies.

A-11-2.3.2 For example, in the case of enclosed interior stairways, where the capacity of the third floor is such as to require three stairways, and the capacity of the second floor also requires three stairways, the second floor may utilize the stairways also serving the third floor so that the total number of stairways required is three, not six. However, the street floor and basement must have their required exit capacity provided by separate exits or, if the path of exit from the street floor or basement is through a part of the same stair tower serving the upper floors, the total exit capacity must be such as to provide required exit facilities for street floor and basement without encroaching upon the stair capacity required for upper floors. This assumes that because of greater travel distance the occupants of floors above the second will require a longer time to reach the street and will not make simultaneous exit.

A-11-2.5.1 A school plan with outside doors or stairways at both ends of a central corridor meets this requirement. Pockets may be created where stairways are not at the end of corridors but at intermediate points.

A-11-2.5.5.1 School design providing classroom exits directly to the outside or to exterior balconies open to the outside air with exterior stairways available to either direction to grade is considered preferable, from the fire safety standpoint, to the more conventional design using interior corridors which can become untenable from the accumulation of smoke and heat.

A-11-2.9(b) Exception to (b) 2 This does not exempt shops and laboratories.

A-11-2.11.5 It is highly desirable to have all windows of a type which can be readily opened from inside, and to have them large enough and low enough for use by students, teachers, and fire fighters. Windows may serve as a supplementary means of emergency escape, particularly where ladders can be raised by fire fighters or others. Even where the location is such as to preclude the use of windows for escape purposes, they may provide air for breathing in a smoke-filled room while trapped occupants are awaiting rescue. Windows should have sills not too high above the floor.

Where awning or hopper-type windows are used, they should be so hinged or subdivided as to provide a clear opening not less than 600 sq in. (.39 sq m) in area, nor any dimension less than 22 in. (55.9 cm). Screen walls or devices in front of required windows should not interfere with normal rescue requirements.

A-11-3.3.1 Exception NFPA 220, *Standard on Types of Building Construction* (*see Appendix B*) defines Type IV (2HH) construction. (*Also see A-6-2.1.*)

A-11-7.1.1.1 It should be noted that this paragraph does not require the staff ratios indicated, but only states that the requirements of this section are based on these staff ratios. If these staff ratios are not maintained, it would be the responsibility of the authority having jurisdiction to determine what additional safeguards above and beyond the requirements of this section would be necessary. Typical additional provisions may include restricting the day-care center 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 upon the situation.

A-11-7.1.1.2 Day-care centers do not provide for the full-time maintenance of a client. Occupancies which provide a primary place of residence are dealt with in other occupancies. See Chapters 16 through 22, "Residential Occupancies."

A-11-7.2.11.1 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 like refrigerators or freezers.

A-11-8 The requirements detailed in Section 11-8, Group Day-Care Homes (fewer than 13 clients), are based on the minimum staff-to-client ratio of two staff for up to 12 clients with no more than three children under age 2.

A-11-8.1.1.1 Group day-care homes do not provide for the full-time maintenance of a client. Occupancies which provide a primary place of residence are dealt with in other occupancies. See Chapters 16 through 22, "Residential Occupancies."

A-11-8.1.6 Each building used as a group day-care home should meet the local minimum housing code and fire prevention code for the applicable class of residential construction or, if none exists, a nationally recognized model code.

A-11-8.2.11.1 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 like refrigerators or freezers.

A-11-9 The requirements detailed in Section 11-9, Family Day-Care Homes, are based on the minimum staff-to-client ratio of one staff for up to six clients, including the caretaker's own children under age 6, with no more than two children under age two.

A-11-9.1.1.1 Family day-care homes do not provide for the full-time maintenance of a client. Occupancies which provide a primary place of residence are dealt with in other occupancies. See Chapters 16 through 22, "Residential Occupancies."

A-11-9.1.6 Each building used as a family day-care home should meet the local minimum housing code and fire prevention code for the applicable class of residential construction or, if none exists, a nationally recognized model code.

A-11-9.2.11.2 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 like refrigerators or freezers.

CHAPTER 12

A-12-1.1.1.1 Exception The Exception specifically authorized for hospitals and nursing homes by this paragraph in no way limits or prohibits any other use or application of the equivalency concepts set forth in Section 1-5 or elsewhere in this *Code*.

A-12-1.1.1.6 Residential buildings or sections of residential buildings which house mental patients who are capable of judgment and appropriate physical action for self-preservation under emergency conditions may be classed as a residential occupancy and, therefore, become subject to the provisions of Chapters 16 through 22 of this *Code*.

A-12-1.1.2 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:

(a) Prevention of ignition
(b) Detection of fire
(c) Control of fire development
(d) Confinement of the effects of fire
(e) Extinguishment of fire
(f) Provision of refuge and/or evacuation facilities
(g) Staff reaction.

A-12-1.1.4.4 A conversion from a hospital to a nursing home or from a nursing home to a hospital is not considered a change in occupancy classification.

A-12-1.2.1 Doctors' offices, treatment, and diagnostic facilities intended solely for outpatient care and physically separated from facilities for the treatment or care of inpatients, but otherwise associated with the management of an institution, may be classified as Business Occupancy, rather than Health Care Occupancy.

A-12-1.2.2 Exception It is expected that an occasional hospital patient who may be litter-borne will enter ambulatory care, medical clinics and similar facilities which are primarily intended to provide outpatient services and are classified as a Business or Ambulatory Care Occupancy.

A-12-1.3(d) The intent of the definition of a supervisory care facility is to describe a condition where the patients involved can, with the unlocking of any locked doors and/or the assistance and guidance of the staff, rapidly evacuate the building or move to an internal area of refuge. The authority having jurisdiction may require additional safeguards if this intent is not being met or may classify as supervisory care occupancy facilities involving some patients who are not individually capable of self-preservation, if it is demonstrated to his satisfaction that the intent of the ability to rapidly evacuate all patients is present at all times.

A-12-1.6.6 Materials such as tight-fitting metal plates, masonry fill or products listed for this purpose may be used to satisfy this requirement.

A-12-2.2 Ramps are undesirable in hospitals and nursing homes because of the accident hazard in both normal and emergency traffic except in the case of ramps of extremely gradual slope, which require so much space as to be impractic-

able in most situations. They are, however, the only practicable method of moving patients in beds from one story to another, except by elevators which may not be available under fire conditions. The best plan is to provide for horizontal egress to another section of the building, minimizing the need for complete evacuation.

Ramps may be the best means for providing egress from doors 2 or 3 steps above or below the grade level, and also to compensate for minor difficulties in floor levels between adjoining sections of buildings. Such ramps should be in accordance with 12-2.2.5.

A-12-2.2.4 In planning exits, arrangements should be made to transfer patients from one section of a floor to another section of the same floor separated by a fire barrier or smoke barrier in such a manner that patients confined to their beds may be transferred in their beds. Where the building design will permit, 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 may be taken and the area from which they must be evacuated because of threatening smoke and fire.

A-12-2.3.2 These exit capacities, which are substantially less than for other parts of this *Code* dealing with exits for occupants in normal health, are based on the assumption that some of the occupants cannot leave without physical assistance, and some may have to be carried or moved in beds.

A-12-2.3.3 Occupant characteristics are an important factor to be evaluated in setting exit criteria. Exit components in non-patient use areas, such as Administrative Office spaces, should be evaluated based upon actual use. A minimum "clear" corridor width of 44 in. (112 cm) is specified, assuming occupants in non-patient areas will be mobile and capable of evacuation without assistance.

A-12-2.3.4 (*See A-12-2.3.3.*)

A-12-2.4.3 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-12-2.11.5 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 these necessities, it is practical to presume that such doors will be kept open even to the extent of employing wood chocks and other makeshift devices. All doors described in 12-2.11.5 should, therefore, be equipped with automatic hold-open devices, activated by the methods described regardless of whether or not the original installation of the doors was predicated on a policy of keeping them closed.

A-12-3.1.1 Exception No. 5 Where openings occur around pipes or conduits penetrating floors or ceilings, materials such as tight-fitting metal plates, masonry fill or products listed for this purpose may be used to seal the opening.

A-12-3.2.1 For flammable liquid storage, reference should be made to NFPA 30, *Flammable and Combustible Liquids Code* (*see Appendix B*). Rooms in clinical laboratories in which automatic processing of specimens with flammable solvents is likely to take place when the equipment is unattended present a limited hazard which may be more readily protected through use of sprinklers connected to the domestic water supply. Provisions for the enclosure of rooms used for charging linen and waste chutes or for the rooms into which chutes empty are provided in Chapter 7. In addition to the fire-resistive cutoff of rooms into which linen chutes and waste chutes discharge, automatic sprinkler protection is considered essential. Provisions for the protection of storage facilities for flammable gases and oxygen are covered in Chapter 3 of NFPA 99, *Standard for Health Care Facilities*, and NFPA 56F, *Standard for Nonflammable Medical Gas Systems* (*see Appendix B*).

A-12-3.2.2 The hazard level of a laboratory is considered severe if quantities of flammable, combustible or hazardous materials are present which are capable of sustaining a fire condition of sufficient magnitude to breach a 1-hour fire separation.

See NFPA *Fire Protection Handbook* (*see Appendix B*), Section 6 Chapter 8, for guidance.

A-12-3.2.4 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 requirements of commercial cooking equipment.

A-12-3.3.2 It is recognized that underlayment may affect the flame spread characteristics of floor coverings. Where floor coverings involve a separate underlayment, it is suggested the underlayment/floor finish system be tested as an assembly in accordance with procedures outlined within NFPA 253, *Standard Method of Test of Critical Radiant Flux of Floor Covering Systems Using A Radiant Heat Energy Source* (*see Appendix B*).

A-12-3.6.1 Corridor partitions, in sprinklered or nonsprinklered facilities, are intended to be constructed to resist the passage of smoke.

For the purpose of this paragraph only, the term "direct supervision" is meant to convey that the opening to the corridor from the waiting area should be visible from an occupied staff location.

A-12-3.6.3 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, may create a special hazard for the personal safety of a room occupant. These closed doors may 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 consideration be given that rooms having doors equipped with closing devices be protected by approved automatic smoke detection which is interconnected with the building fire alarm. Such detection may be located at any approved point within the room. When activated, the detector must provide warning that indicates the specific room of involvement by activation of fire alarm annunciator, nurse call system, or any other device acceptable to the authority having jurisdiction.

A-12-3.6.5 Exception Sink closets should not be used for the storage of flammable or combustible supplies.

A-12-3.7 In planning exits, arrangements should be made to transfer patients from one section of a floor to another section of the same floor separated by a fire barrier or smoke barrier in such a manner that patients confined to their beds may be transferred in their beds. Where the building design will permit, 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 an arrangement, where the lobby is centrally located, will, in effect, produce a smoke lock, placing a double barrier between the area to which patients may be taken and the area from which they must be evacuated because of threatening smoke and fire.

A-12-5.2.2 One purpose of this paragraph is to prevent the ignition of clothing, bedclothes, furniture, or other furnishings by the heating device. Overcoming this possibility may be accomplished through the design or installation of the device, as by a suitable guard or enclosure. It is generally agreed that the maximum acceptable temperature to which combustible materials may be exposed for prolonged periods of time is in the order of 160°F (71°C) to 190°F (88°C).

A-12-6.2.3.2 Corridors or passageways within the ambulatory health care center which are used in moving patients who are temporarily nonambulatory from one room to another room or area should be of adequate width to meet the functional needs of the facility. The minimum width required for exit access is based on ambulatory occupants and is intended to address the common exit corridors for passageways in the building.

A-12-6.2.3.3 Doors within the ambulatory health care center which are used in moving patients who are temporarily nonambulatory should be of adequate width to meet the functional needs of the facility. The minimum width for doors is based on ambulatory occupants and is intended to address the common doors for the building.

A-12-6.5.2.2 One purpose of this paragraph is to prevent the ignition of clothing, bedclothes, furniture, or other furnishings by the heating device. Overcoming this possibility may be accomplished through the design of the device or through its installation , as by a suitable guard or enclosure. It is generally agreed that the maximum acceptable temperature to which combustible materials may be exposed for prolonged periods of time is in the order of 160°F (71°C) to 190°F (88°C).

CHAPTER 13

A-13-1.1.1.1 Exception The Exception specifically authorized for hospitals and nursing homes by this paragraph in no way limits or prohibits any other use or application of the equivalency concepts set forth in Section 1-5 or elsewhere in this *Code*.

A-13-1.1.1.6 Residential buildings or sections of residential buildings which house mental patients who are capable of judgment and appropriate physical action for self-preservation under emergency conditions may be classed as a residential occupancy and, therefore, become subject to the provisions of Chapters 16 through 22 of this *Code*.

A-13-1.1.2 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:

(a) Prevention of ignition
(b) Detection of fire
(c) Control of fire development
(d) Confinement of the effects of fire
(e) Extinguishment of fire
(f) Provision of refuge and/or evacuation facilities
(g) Staff reaction.

A-13-1.1.4.4 A conversion from a hospital to a nursing home or from a nursing home to a hospital is not considered a change in occupancy classification.

A-13-1.2.1 Doctors' offices, treatment, and diagnostic facilities intended solely for outpatient care and physically separated from facilities for the treatment or care of inpatients, but otherwise associated with the management of an institution, may be classified as Business Occupancy, rather than Health Care Occupancy.

A-13-1.2.2 Exception It is expected that an occasional hospital patient who may be litter-borne will enter ambulatory care, medical clinics and similar facilities which are primarily intended to provide outpatient services and are classified as a Business or Ambulatory Care Occupancy.

A-13-1.3(d) The intent of the definition of a supervisory care facility is to describe a condition where the patients involved can, with the unlocking of any locked doors, and/or the assistance and guidance of the staff, rapidly evacuate the building or move to an internal area of refuge. The authority having jurisdiction may require additional safeguards if this intent is not being met or may classify as supervisory care occupancy, facilities involving some patients who are not individually capable of self-preservation if it is demonstrated to his satisfaction that the intent of the ability to rapidly evacuate all patients is present at all times.

A-13-1.6.4 Materials such as tight-fitting metal plates, masonry fill or products listed for this purpose may be used to satisfy this requirement.

A-13-2.2.4(b) The waiver of swinging of doors in the direction of exit travel is based on the assumption that in this occupancy there will be no possibility of a panic rush which might prevent opening of doors swinging against exit travel.

A desirable arrangement, possible with corridors 8 ft (244 cm) or more in width, is to have two 42-in. (107-cm) doors, normally closed, each swinging with the exit travel (in opposite directions).

A-13-2.3.4 For functional purposes, the facility may require door widths of a greater dimension.

A-13-2.4.3 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-13-2.5.5 Every exit or exit access should be so arranged, if practical and feasible, that no corridor, passageway or aisle has a pocket or dead end exceeding 30 ft (9.1 cm).

A-13-2.11.5 It is desirable to keep doors in exit passageways, horizontal exits, smoke barriers, stair enclosures, 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 these necessities, it is practical to presume that such doors will be kept open even to the extent of employing wood chocks and other makeshift devices. All doors described in 13-2.11.5 should, therefore, be equipped with automatic hold-open devices, actuated by the methods described regardless of whether or not the original installation of the doors was predicated on a policy of keeping them closed.

A-13-2.11.7 Doors to the enclosures of interior stair exits should be arranged to open from the stair side at least at every third floor so that it will be possible to leave the stairway at such floor should the fire render the lower part of the stair unusable during egress or should the occupants seek refuge on another floor.

A-13-3.1.1 Exception No. 3 Where openings occur around pipes or conduits penetrating floors or ceilings, materials such as tight-fitting metal plates, masonry fill or products listed for this purpose may be used to seal the opening.

A-13-3.2.2 The hazard level of a laboratory is considered severe if quantities of flammable, combustible or hazardous materials are present which are capable of sustaining a fire condition of sufficient magnitude to breach a 1-hour fire separation.

See NFPA *Fire Protection Handbook* (*see Appendix B*), Section 6 Chapter 8, for guidance.

A-13-3.2.4 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 requirements of commercial cooking equipment.

A-13-3.3 Section 6-5 provides for the application of approved flame-retardant coatings to correct excessive flame spread characteristics of certain types of existing interior finish.

A-13-3.6.1 Corridor partitions in sprinklered and nonsprinklered facilities are intended to be constructed to resist the passage of smoke.

The intent of the 20-minute 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, ½-in. (1.27-cm) gypsum board, wood lath and plaster, gypsum lath or metal lath and plaster.

For the purpose of this paragraph only, the term "direct supervision" is meant to convey that the opening to the corridor from the waiting area should be visible from an occupied staff location.

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-13-3.6.3 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, may create a special hazard for the personal safety of a room occupant. These closed doors may 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 consideration be given that rooms having doors equipped with closing devices be protected by approved automatic smoke detection which is interconnected with the building fire alarm. Such detection may be located at any approved point within the room. When activated, the detector must provide warning that indicates the specific room of involvement by activation of fire alarm annunciator, nurse call system, or any other device acceptable to the authority having jurisdiction.

In existing buildings a number of options exist for reasonably assuring patient room doors will be closed and remain closed during a fire:

(1) Doors may have positive latches, coupled with a suitable training program for staff to close the doors in an emergency.

(2) Similarly, roller latches maintained and acceptable to the authority having jurisdiction, coupled with adequate staff training, might be used.

(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 minimum closing force of 5 lb (22 N) on the door latch stile.

A-13-3.6.5 Exception Sink closets should not be used for the storage of flammable or combustible supplies.

A-13-5.2.2 One purpose of this paragraph is to prevent the ignition of clothing, bedclothes, furniture, or other furnishings by the heating device. Overcoming this possibility may be accomplished through the design of the device or through its installation, as by a suitable guard or enclosure. It is generally agreed that the maximum acceptable temperature to which combustible materials may be exposed for prolonged periods of time is in the order of 160°F to 190°F (71°C to 88°C).

A-13-6.2.3.2 Corridors or passageways within the ambulatory health care center which are used in moving patients who are temporarily nonambulatory from one room to another room or area should be of adequate width to meet the functional needs of the facility. The minimum width required for exit access is based on ambulatory occupants and is intended to address the common exit corridors for passageways for the building.

A-13-6.2.3.3 Doors within the ambulatory health care center which are used in moving patients who are temporarily nonambulatory should be of adequate width to meet the functional needs of the facility. The minimum width for doors is based on ambulatory occupants and is intended to address the common doors for the building.

A-13-6.5.2.2 One purpose of this paragraph is to prevent the ignition of clothing, bedclothes, furniture, or other furnishings

by the heating device. Overcoming this possibility may be accomplished through the design or installation of the device, as by a suitable guard or enclosure. It is generally agreed that the maximum acceptable temperature to which combustible materials may be exposed for prolonged periods of time is in the order of 160°F to 190°F (71°C to 88°C).

CHAPTER 14

A-14-1.1.2 Exception No. 2 The exception specificially authorized by this section in no way limits or prohibits any other use of the equivalency concepts set forth in Section 1-5 or elsewhere in this *Code*.

A-14-1.2 Detention and correctional facilities are a complex of structures, each serving a definite and usually different purpose. For instance, in all probability there will be represented in many institutions an example of all, or almost all, of the occupancy-type classifications found in this *Code*. Exits and other features shall be 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 this chapter and Section 4-1 as a guide, subject to the ruling of the authority having jurisdiction in case of 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, are always to be considered by the authority having jurisdiction.

A-14-1.4.1 Free movement to (1) a public way, (2) a building separated from the fire area by 2-hour fire-resistive construction or 50 ft (15 m) of open space, or (3) an outside secure area having a holding space at least 50 ft (15 m) from the zone of fire origin that provides 15 sq ft (1.4 sq m) or more of refuge area per person (resident, staff, visitors, etc.) that may be present at time of fire, also fulfills the requirement of a smoke compartment.

Figure A-14-1.4.1 illustrates the five Use Conditions.

A-14-1.4.2 Prompt operation is intended to be accomplished in the period of time following detection of fire by either the smoke detector(s) required by 14-3.4 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 this example, a prompt release time would be 2 minutes.

A-14-2.4.3 An exit is not necessary for 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 origin.

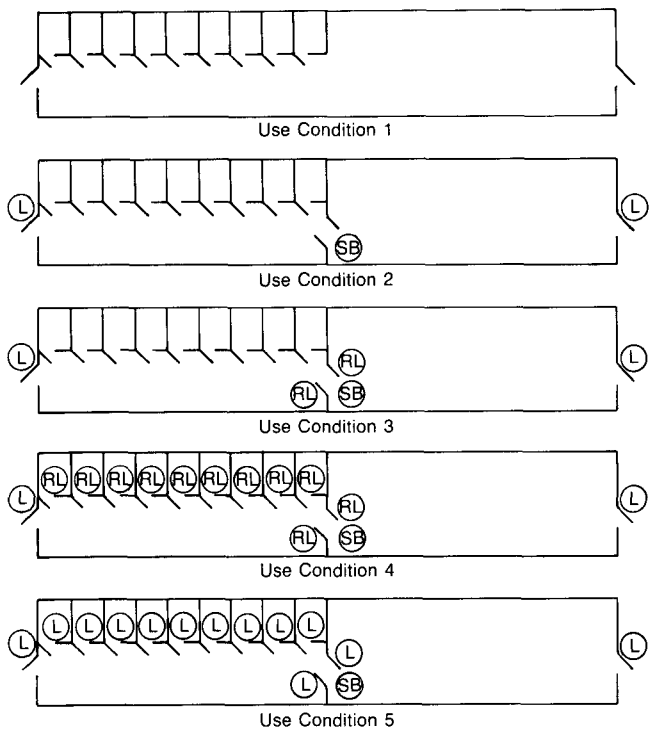


Figure A-14-1.4.1

A-14-2.11.3 It may be necessary to provide a certain number of resident sleeping rooms with doors providing a minimum clear width of 32 in. (81 cm) (*see 5-2.1.2.1*) in order to comply with the requirements for the physically handicapped. Such sleeping rooms should be located where there is a direct accessible access to the exterior or to an area of safe refuge (*see 14-3.7*).

A-14-2.11.6 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 not practical for attendants to unlock doors individually. Doors in an exit should be unlocked prior to unlocking sleeping room doors.

A-14-3.2.2 It is strongly recommended that padded cells not be used due to the 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 ¾-hour fire door will be violated with the plant on of the padding, but a ¾-hour fire door should be the base of the assembly.

A-14-3.4.3.1 Exception No. 2 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 which can initiate the general alarm function and contact the fire department.

A-14-3.5.4 Exception No. 1 Where access to portable fire extinguishers is locked, staff should be present on a 24-hour basis and have keys readily available to unlock access to the extinguishers. Where supervision of sleeping areas is from a 24-hour manned staff location, portable fire extinguishers may be provided at the staff location in lieu of other areas.

A-14-3.7.2 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 gage steel plate suitably framed and stiffened meets this requirement.

CHAPTER 15

A-15-1.1.2 Exception No. 2 The exception specifically authorized by this section in no way limits or prohibits any other use of the equivalancy concepts set forth in Section 1-5 or elsewhere in this *Code*.

A-15-1.2 Detention and correctional facilities are a complex of structures each serving a definite and usually different purpose. For instance, in all probability there will be represented in many institutions an example of all, or almost all, of the occupancy-type classifications found in this *Code*. Exits and other features shall be 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 this chapter and Section 4-1 as a guide, subject to the ruling of the authority having jurisdiction in case of 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, are always to be considered by the authority having jurisdiction.

A-15-1.4.1 Free movement to (1) a public way, (2) a building separated from the fire area by two-hour fire resistive construction or 50 ft (15 m) of open space, or (3) an outside secure area having a holding space at least 50 ft (15 m) from the zone of fire origin that provides 15 sq ft (1.4 sq m) or more of refuge area per person (resident, staff, visitors, etc.) that may be present at time of fire, also fulfills the requirement of a smoke compartment.

Figure A-15-1.4.1 illustrates the five Use Conditions.

A-15-1.4.2 Prompt operation is intended to be accomplished in the period of time following detection of fire by either the smoke detector(s) required by 15-3.4 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 this example, a prompt release time would be 2 minutes.

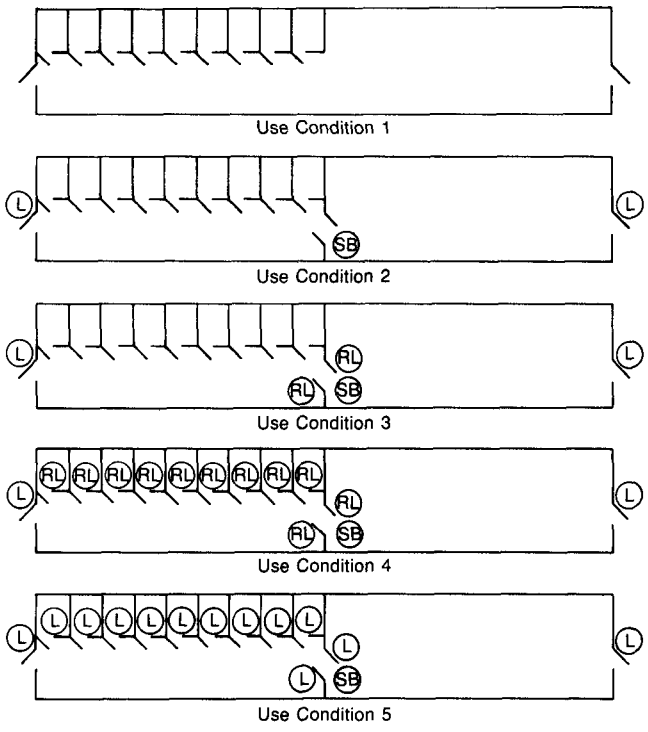


Figure A-15-1.4.1

A-15-2.2.1(d) 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 origin.

A-15-2.4.3 An exit is not necessary from each individual fire compartment and smoke compartment if there is access to an exit through other fire sections or smoke compartments without passing through the fire section or smoke compartment of origin.

A-15-2.5.2 Every exit or exit access should be so arranged, if feasible, 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-15-2.11.3 It may be necessary to provide a certain number of resident sleeping rooms with doors providing a minimum clear width of 32 in. (81 cm) (*see 5-2.1.2.1*) in order to comply with the requirements for the physically handicapped. Such sleeping rooms should be located where there is a direct accessible access to the exterior or to an area of safe refuge (*see 15-3.7*).

A-15-2.11.6 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 not practical for attendants to unlock doors individually. Doors in an exit should be unlocked prior to unlocking sleeping room doors.

A-15-3.1.3 A Recommended Method of Calculating Expected Level of Smoke in a Smoke Removal Equipped Cell Block.

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/sq ft (29 kg/sq m)] 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-15-3.1.3 should be limited to situations where there is at least 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 at least equal to Z and the fan is at least 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 may be determined by the following procedure:

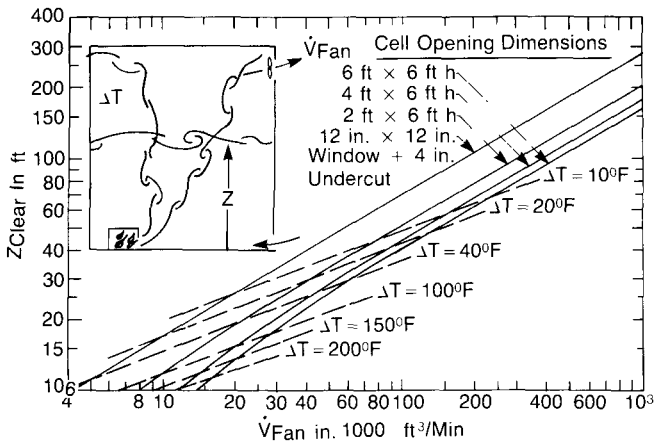
1. *Acceptable smoke level.* Determine the lowest acceptable level of smoke accumulation in accordance with 15-3.1.3. The vertical distance between that level and the floor level of the lowest open cell is the value of Z to be used in connection with Figure A-15-3.1.3(a).

2. *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-15-3.1.3(b) and use the corresponding curve on Figure A-15-3.1.3(a). If there is no match between the size and shape of opening and Figure A-15-3.1.3(a) then interpolate between the curves. If the opening exceeds 6 ft (183 cm) by 6 ft (183 cm), use the curve for a 6 ft (183 cm) by 6 ft (183 cm) opening. This curve is considered to represent the maximum burning situation and increasing the size of the opening will not increase the actual burning rate.

3. *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-15-3.1.3(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 must be provided at a point higher than Z.

4. *Intake air.* Provide intake air openings that are either present or automatically provided at times of emergency smoke removal. These 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.

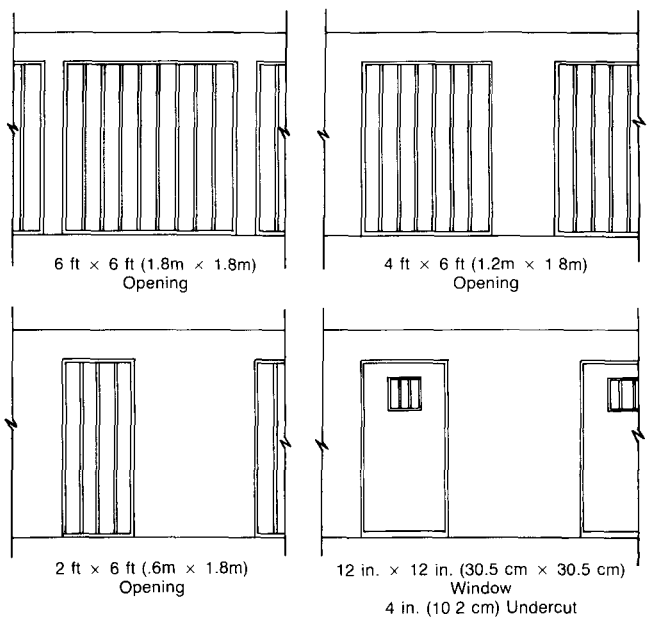
5. *Fan temperature rating.* Determine the potential temperature of gases that the fan may be required to handle. To do this, determine the distance from the floor of the highest cell to the centerline of the fan (or fan ports if the fan is in a duct or similar arrangement). Determine the intersection of this new "Z" value with the appropriate ventilation rate curve (solid line) on Figure A-15-3.1.3(a). Estimate the temperature rise by interpolating along the appropriate ventilation rate curve and between the constant temperature rise curves (dashed lines) on Figure A-15-3.1.3(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.



ΔT—Temperature of Upper Layer Gases Above Ambient
—Ventilation Rate Curves
– –Constant Temperature Rise Curves
V̇Fan — Fan Discharge Capacity (As Installed)
ZClear — Distance From Cell Floor to Smoke Layer

Conversion: (ft) × .3048 = (m); (cu ft/min) × .00047 = (cu m/s); (°F–32) ÷ 1.8 = °C.

Figure A-15-3.1.3(a) Cell Block Smoke Control Ventilation Curves.



Conversion: 1 in. = 2.54 cm.

Figure A-15-3.1.3(b) Typical Cell Openings.

6. *Operation of exhaust system.* The emergency exhaust system should be arranged to initiate automatically on detection of smoke, operation of a manual fire alarm system, or direct manual operation. The capability to manually start the automatic exhaust system should be provided in a guard post in the cell block and/or at another control location. When appropriate the emergency exhaust fans may be used for comfort ventilation as well as serving their emergency purposes.

A-15-3.2.2 It is strongly recommended that padded cells not be used due to the 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 ¾-hour fire door will be violated with the "plant on" of the padding, but a ¾-hour fire door should be the base of the assembly.

A-15-3.4.3.1 Exception No. 2 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 which can initiate the general alarm function and contact the fire department.

A-15-3.5.1 When the openings in ceilings or partitions are ¼ in. (.64 cm) or larger in the least dimension, where the thickness or depth of the material does not exceed the least dimension of the openings, and when such openings constitute at least 70 percent of the area of the ceiling or partition material, the disruption of sprinkler spray patterns may be disregarded.

A-15-3.5.4 Exception No. 1 Where access to portable fire extinguishers is locked, staff should be present on a 24-hour basis and have keys readily available to unlock access to the extinguishers. Where supervision of sleeping areas is from a 24-hour manned staff location, portable fire extinguishers may be provided at the staff location in lieu of within the sleeping area.

A-15-3.7.1 Consideration can be given for large open areas which may function as smoke sinks as an alternative to the installation of more than one smoke barrier as required by this section.

A-15-3.7.1(a) Vertical movement downward to an area of refuge may be accepted by the authority having jurisdiction in lieu of horizontal movement.

A-15-3.7.1(b) Consideration should be given to increasing the travel distance to a smoke barrier to coincide with existing range lengths and exits.

A-15-3.7.2 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 gage steel plate suitably framed and stiffened meets this requirement.

CHAPTER 16

A-16-1.5.1 The contents of living units in residential occupancies fall into the ordinary hazard classification, with characteristics of moderately rapid burning and considerable smoke generation, and with the added hazard of the possible presence of toxic combustion products.

A-16-1.7.1 Dormitory-type occupancy, particularly where 2- or 3-tier bunks are used with close spacing, may produce an. occupant load substantially greater than one person per 200 sq ft (18.6 sq m) gross floor area. However, even though sleeping areas are densely populated, the building as a whole may not necessarily exceed one person per 200 sq ft (18.6 sq m) gross area, owing to the space taken for toilet facilities, halls, closets, and living rooms not used for sleeping purposes.

A-16-2.1.3 Under this paragraph, if the second and third floor were each required to have three stairways, the second floor may use the stairways serving the third floor so that the total number of stairways required is three, not six.

A-16-2.3.2 The street-floor exits should be sized to accommodate the combined street-floor occupant load plus the occupant load of the stairways which converge onto the street floor. The street-floor exits should be sized based upon 100 persons per unit of exit width for horizontal movement through exterior exit doorways plus the converging stairway capacities at 75 persons per unit of exit width for vertical movement onto the street floor. As such, a two-unit stairway calculated at 75 persons per unit will have the same design capacity as a 1½ unit doorway calculated at 100 persons per unit; i.e., 150 persons each. (*See 5-3.1.4.*)

A-16-2.11.1 It is the intent of this requirement that security measures, when installed, should not prevent egress.

A-16-2.11.2 This arrangement makes it possible to leave the stairway at any floor should the fire render the lower part of the stair unusable during egress or should the occupants seek refuge on another floor.

A-16-3.1.2 Where open stairways are permitted, they are considered as exit access to exits, rather than as exits, and requirements for distance to exits include the travel on such stairs. (*See 5-6.5.*)

A-16-3.4.3.4 The provision for immediate notification of the public fire department is intended to include, but not be limited to, all of the arrangements listed in 7-6.4, Emergency Forces Notification. Other arrangements that depend on a clerk or other member of the staff to notify the fire department may also be acceptable. In such case, 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 unlocking of a device to contact the fire department.

A-16-3.8.1 The ultimate success of achieving a smokeproof enclosure by use of mechanical means is, in many applications, a direct function of the number of "open stairway doors" at any given time during the emergency period. Depending upon

the mechanical pressurization technique, the optimum solution in most cases would be to initially notify occupants of the immediate fire affected floors on a "selective" or "staged" system of alarming as compared to a general alarm of the total building. This could be initiated, subject to the authority having jurisdiction, by the utilization of water flow alarms at each floor or smoke detection at each floor, or by manual pull stations or any combination of the above which: (1) instantaneously activates the alarm of the floor of initial hazard and floors immediately above and below; (2) after a reasonable delay (perhaps 90 seconds maximum), alerts other building floors on a zoned mode; and (3) subsequently activates a building general alarm.

It is important that each situation should be individually considered. The approach utilized for a very tall building could differ from the approach in a limited high-rise structure.

A-16-4.1 Windows may serve as a means of emergency escape, particularly where ladders can be raised by fire fighters or others. Even where the location is such as to preclude the use of windows for escape purposes, they may provide air for breathing in a smoke-filled room while trapped occupants are awaiting rescue. Windows should have sills not too high above the floor; windows lower than 44 in. (112 cm) above the floor are preferable.

Where awning- or hopper-type windows are used, they should be so hinged or subdivided as to provide a clear opening of at least 5.7 sq ft (.53 sq m). Where storm windows, screens, or burglar guards are used, these should be provided with quick-opening devices so that they may be readily opened from the inside for emergency egress.

A-16-5.3 "Protected Power Supply" means a source of electrical energy of sufficient capacity to permit proper operation of the elevator and its associated control and communications systems and whose point of origin, system of distribution, type and size of over-current protection, degree of isolation from other portions of the building electrical system, and degree of mechanical protection are such that it is unlikely that the supply would be disrupted at any but the advance stages of building fire-involvement or structural collapse.

A "Protected Power Supply" should provide at least the level of reliability associated with, and may consist of, an electrical distribution system whose service equipment is located and installed in accordance with Sections 230-72(b) and 230-82, Exception No. 5 of NFPA 70, *National Electrical Code* (*see Appendix B*), and which has no other connection to the "normal" building electrical distribution system. A "Protected Power Supply" need not incorporate two sources of energy nor automatic transfer capability from a "normal" to an "emergency" source, e.g., 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, so as to ensure conformance with Section 230-95 of NFPA 70, *National Electrical Code* (*see Appendix B*), 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* (*see Appendix B*), except that the "energy absorption means" required by Section 620-91 should always be connected on the load-side of the disconnecting means and 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, e.g., light and power loads external to the elevator equipment room.

CHAPTER 17

A-17-1.5.1 The contents of living units in residential occupancies fall into the ordinary hazard classification, with characteristics of moderately rapid burning and considerable smoke generation, and with the added hazard of the possible presence of toxic combustion products.

A-17-1.7.1 Dormitory-type occupancy, particularly where 2- or 3-tier bunks are used with close spacing, may produce an occupant load substantially greater than one person per 200 sq ft (18.6 sq m) gross floor area. However, even though sleeping areas are densely populated, the building as a whole may not necessarily exceed one person per 200 sq ft (18.6 sq m) gross area, owing to the space taken for toilet facilities, halls, closets, and living rooms not used for sleeping purposes.

A-17-2.1.3 Under this paragraph, if the second and third floor were each required to have three stairways, the second floor may use the stairways serving the third floor so that the total number of stairways required is three, not six.

A-17-2.2.2 Due to the nature of escalators they are no longer acceptable as a component in the means of egress. However, since many escalators have been used for exit access and exit discharge in the past, credit may be continued. Very few escalators have ever been installed in a manner to qualify as an exit. For information on escalator protection and requirements the reader is referred to previous editions of the *Code*.

A-17-2.3.2 The street-floor exits should be sized to accommodate the combined street-floor occupant load plus the occupant load of the stairways which converge onto the street floor. The street-floor exits should be sized based upon 100 persons per unit of exit width for horizontal movement through exterior exit doorways plus the converging stairway capacities at 75 persons per unit of exit width for vertical movement onto the street floor. As such, a two-unit stairway calculated at 75 persons per unit will have the same design capacity as a 1½-unit doorway calculated at 100 persons per unit; i.e., 150 persons each. (*See 5-3.1.4.*)

A-17-2.11.1 It is the intent of this requirement that security measures, when installed, should not prevent egress.

A-17-2.11.2 This arrangement makes it possible to leave the stairway at any floor should the fire render the lower part of the stair unusuable during egress or should the occupants seek refuge on another floor.

A-17-3.1.2 Where open stairways or escalators are permitted, they are considered as exit access to exits, rather than as exits, and requirements for distance to exits include the travel on such stairs. (*See 5-6.5.*)

A-17-3.4.3.2 The provision for immediate notification of the public fire department is intended to include, but not be limited to, all of the arrangements listed in 7-6.4, Emergency Forces Notification. Other arrangements that depend on a clerk or other member of the staff to notify the fire department may also be acceptable. In such case, 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 unlocking of a device to contact the fire department.

CHAPTER 18

A-18-1.5.1 The contents of living units in residential occupancies fall into the ordinary hazard classification, with characteristics of moderately rapid burning and considerable smoke generation, and with the added hazard of the possible presence of toxic combustion products.

A-18-1.7.1 Dormitory-type occupancy, particularly where 2- or 3-tier bunks are used with close spacing, may produce an occupant load substantially greater than one person per 200 sq ft (18.6 sq m) gross floor area. However, even though sleeping areas are densely populated, the building as a whole may not necessarily exceed one person per 200 sq ft (18.6 sq m) gross area, owing to the space taken for toilet facilities, halls, closets, and living rooms not used for sleeping purposes.

A-18-2.3.2 The street-floor exits should be sized to accommodate the combined street-floor occupant load plus the occupant load of the stairways which converge onto the street floor. The street-floor exits should be sized based upon 100 persons per unit of exit width for horizontal movement through exterior exit doorways plus the converging stairway capacities at 75 persons per unit of exit width for vertical movement onto the street floor. As such, a two-unit stairway calculated at 75 persons per unit will have the same design capacity as a 1½-unit doorway calculated at 100 persons per unit; i.e., 150 persons each. (*See 5-3.1.4.*)

A-18-2.11.3 It is the intent of this requirement that security measures, when installed, should not prevent egress.

A-18-3.1.3 Where open stairways are permitted, they are considered as exit access to exits, rather than as exits, and requirements for distance to exits include the travel on such stairs. (*See 5-6.5.*)

A-18-3.6.3 Longer ratings may be required where doors are provided for property protection as well as life safety.

This does not require a listed or labeled assembly but addresses only the door.

CHAPTER 19

A-19-1.5.1 The contents of living units in residential occupancies fall into the ordinary hazard classification, with characteristics of moderately rapid burning and considerable smoke generation, and with the added hazard of the possible presence of toxic combustion products.

A-19-1.7.1 Dormitory-type occupancy, particularly where 2- or 3-tier bunks are used with close spacing, may produce an occupant load substantially greater than one person per 200 sq ft (18.6 sq m) gross floor area. However, even though sleeping areas are densely populated, the building as a whole may not necessarily exceed one person per 200 sq ft (18.6 sq m) gross area, owing to the space taken for toilet facilities, halls, closets, and living rooms not used for sleeping purposes.

A-19-2.2.2 Due to the nature of escalators they are no longer acceptable as a component in the means of egress. However, since many escalators have been used for exit access and exit discharge in the past, credit may be continued. Very few escalators have ever been installed in a manner to qualify as an exit. For information on escalator protection and requirements the reader is referred to previous editions of the *Code*.

A-19-2.3.2 The street-floor exits should be sized to accommodate the combined street-floor occupant load plus the occupant load of the stairways which converge onto the street floor. The street-floor exits should be sized based upon 100 persons per unit of exit width for horizontal movement through exterior exit doorways plus the converging stairway capacities at 75 persons per unit of exit width for vertical movement onto the street floor. As such, a two-unit stairway calculated at 75 persons per unit will have the same design capacity as a 1½-unit doorway calculated at 100 persons per unit; i.e., 150 persons each. (*See 5-3.1.4.*)

A-19-2.11.2 The Committee recognizes the need to provide smoke control in existing buildings. Smokeproof enclosures can be accomplished without the use of a vestibule in accordance with 5-2.3.

A-19-2.11.3 It is the intent of this requirement that security measures, when installed, should not prevent egress.

A-19-3.6.3 This does not require a listed or labeled assembly but addresses only the door.

CHAPTER 20

A-20-1.5.1 The contents of living units in residential occupancies fall into the ordinary hazard classification, with characteristics of moderately rapid burning and considerable smoke generation, and with the added hazard of the possible presence of toxic combustion products.

The *Code* recognizes the potential application of NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Mobile Homes*, to lodging and rooming houses inasmuch as these occupancies can usually be considered similar in character to one- and two-family dwellings with respect to content and hazard classification.

A-20-2.7 It is the intent of this requirement that security measures, when installed, should not prevent egress.

CHAPTER 21

A-21-1.1.1 The requirements in this chapter are designed to accommodate typical changes in the capabilities of the residents such as those due to accidents, temporary illness, cyclical variations in capabilities, and gradual aging. This is based on the assumption that the capabilities of the residents will be evaluated at least annually, and for residents with geriatric problems or degenerative diseases, at least every six months. Also residents should be reevaluated after each accident or illness that requires hospitalization.

A-21-1.3 Residential Board and Care Occupancy. Following are examples of facilities that may be classified as residential board and care occupancies.

(a) A group housing arrangement for physically or mentally handicapped persons who normally may attend school in the community, attend church in the community or otherwise use community facilities.

(b) 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.

(c) A group housing arrangement for the elderly that provides personal care services but that does not provide nursing care.

(d) 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.

(e) Other group housing arrangements that provide personal care services but not nursing care.

A-21-1.3 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 a 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 21-1.3, the application of Appendix F, or a program of drills (timed).

When drills are used, in determining evacuation capability, it is suggested that the facility conduct and record fire drills 12 times per year (4 times per year on each shift), and the facility conduct the drills in consultation with the authority having jurisdiction. Records should indicate the time to evacuate, date and time of day, location of simulated fire origin, the escape paths used, along with comments relating to residents who resisted or failed to participate in the drills.

Translation of drill times to evacuation capability may be determined as: (a) 3 minutes or less, Prompt; (b) over 3 minutes, but not in excess of 13 minutes, Slow; and (c) 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 (i.e., sleeping residents or fewer staff present).

Where the facility management does not furnish an evacuation capability determination acceptable to the authority having jurisdiction, the evacuation capability should be classed as "slow" providing the following conditions are met, otherwise the evacuation capability should be considered "impractical to evacuate."

(a) All residents are able to travel to centralized dining facilities without continuous staff assistance, and

(b) There is continuous staffing whenever there are residents in the facility.

A-21-2.2.1 Exception The Exception specifically authorized for residential board and care occupancies in no way limits or prohibits any other use or application of the equivalency concepts set forth in Section 1-5 or elsewhere in this *Code*.

A-21-3.2.1 Exception The Exception specifically authorized for residential board and care occupancies in no way limits or prohibits any other use or application of the equivalency concepts set forth in Section 1-5 or elsewhere in this *Code*.

A-21-3.2.2.6 This type of building is outside the scope of NFPA 13D. In any case, where the features of an NFPA 13D system are desirable to such a facility, which may be considered comparable to a one- and two-family dwelling, the authority having jurisdiction may be contacted under Section 1-5 of the *Code*.

A-21-4.2.1 Exception The Exception specifically authorized for residential board and care occupancies in no way limits or prohibits any other use or application of the equivalency concepts set forth in Section 1-5 or elsewhere in this *Code*.

CHAPTER 22

A-22-1.5.1 The contents of living units in residential occupancies fall into the ordinary hazard classification, with characteristics of moderately rapid burning and considerable smoke generation, and with the added hazard of the possible presence of toxic combustion products.

A-22-2 The Committee has adopted the phrase "means of escape" to indicate a way out of a residential unit which 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-5-1.1.1*).

A-22-2.1.2 For use of emergency escape devices, refer to A-5-1.1.1.

A-22-2.3.5 It is the intent of this requirement that security measures, when installed, should not prevent egress.

CHAPTER 24

A-24-1.4.2.3 Note that the omission of one balcony from the count of number of floor levels in this case does not waive any of the exit requirements applying to balconies.

A-24-1.7.1 These figures were established on the basis of counts of the population of typical store buildings during periods of maximum occupancy, such as before Christmas or during special sales. In some cases, the actual occupancy may

be more dense than indicated by these figures, but it may reasonably be assumed that in any large mercantile building, all areas will not be similarly crowded at the same time, and the average occupant load should seldom exceed these figures.

In some types of stores, the occupant load will normally be much less than indicated: for example, in furniture stores. However, the character of mercantile operations is subject to such rapid changes that it is not prudent in designing exit facilities to assume that any store will never be crowded, and for this reason the same load figures are used for all types of stores.

A-24-1.7.1(g) The table used in determining the occupancy load for covered mall shopping centers of varying sizes is arrived at empirically in surveying over 270 covered mall shopping centers, in the study of mercantile occupancy parking requirements, and the observed number of occupants per vehicle during peak seasons.

These studies show that with increasing 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 [approx. 600,000 sq ft (56,000 sq m)], a multiplicity of the same types of stores starts to occur: the purpose being to increase the choices available to a customer for any given type of merchandise. Therefore, with increasing shopping center size, the occupant load increases as well, but at a declining rate. In using the table, the occupant load factor is applied to only the gross leasable area utilizing the covered mall as a means of egress.

A-24-2.1.2 Under this paragraph, if the second and third floors of a store building are each required to have three stairways, the second floor may use the stairways serving the third floor so that the total number of stairways required is three, not six.

A-24-2.2.1 This prohibits as required exits, escalators, fire escapes, slide escapes, and any other exit facility not in accordance with the applicable provisions of the *Code*.

A-24-2.5.2 The purpose of this paragraph is to avoid pockets or dead ends of such size as to involve undue danger of persons being trapped in case of fire. It permits small areas such as rooms or alcoves with only one way out where the distance is small enough so that there is little likelihood that a fire might develop to such proportions as to block escape before the occupants become aware of the fire and make their way out.

A-24-2.5.9 It is the intent to provide adequate area for transit and parking of wheeled carts or buggies used by customers to eliminate the obstruction to the means of egress of the interior exit access and the exterior exit discharge. This includes corral areas adjacent to exits that are constructed to restrict the movement of wheeled carts or buggies therefrom.

A-24-2.7 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 24-2.7 should not be confused with open stairways as permitted by 24-3.1 (Exception No. 1).

A-24-2.11.2 The term "principal entrance/exit doors" is intended to imply doors which the authority having jurisdiction can be reasonably assured will be unlocked in order for the facility to do business.

A-24-3.1 See 24-1.7.2 for provisions on determining occupant load for exit purposes where vertical openings are unprotected.

A-24-4.3.1 Exception (b) The minimum requirement for terminating mall exit access in not less than three units of exit width relates to the minimum requirement for at least one aisle in Class A stores [30,000 sq ft (2,800 sq m) or greater] to be 5 ft (152 cm) in width.

A-24-4.3.1 Exception (e) Smoke control systems for covered malls are necessary to maintain the mall reasonably free of products of combustion for at least the duration required to evacuate the building and to minimize migration of products of combustion from one tenant to another. Systems that can be engineered to accomplish this include:

(a) Separate or mechanical exhaust or control systems.

(b) Mechanical exhaust or control systems in conjunction with the heating, ventilating, and air conditioning systems.

(c) Automatically or manually released gravity roof vent devices such as skylights, relief dampers, or smoke vents.

(d) Combinations of (a), (b), and (c) or any other engineered system designed to accomplish the purpose of this section.

A-24-4.3.2.3 It is not the intent of this paragraph to require that large stores be considered anchor stores. A store not considered in determining the occupant load of the mall must be arranged so that all of its means of egress will be independent of the covered mall.

CHAPTER 25

A-25-1.4.2.3 Note that the omission of one balcony from the count of number of floor levels in this case does not waive any of the exit requirements applying to balconies.

A-25-1.7.1 These figures were established on the basis of counts of the population of typical store buildings during periods of maximum occupancy, such as before Christmas or during special sales. In some cases, the actual occupancy may be more dense than indicated by these figures, but it may reasonably be assumed that in any large mercantile building, all areas will not be similarly crowded at the same time, and the average occupant load should seldom exceed these figures.

In some types of stores, the occupant load will normally be much less than indicated: for example, in furniture stores.

However, the character of mercantile operations is subject to such rapid changes that it is not prudent in designing exit facilities to assume that any store will never be crowded, and for this reason the same load figures are used for all types of stores.

A-25-1.7.1(g) The table used in determining the occupancy load for covered mall shopping centers of varying sizes is arrived at empirically in surveying over 270 covered mall shopping centers, in the study of mercantile occupancy parking requirements, and the observed number of occupants per vehicle during peak seasons.

These studies show that with increasing 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 [approx. 600,000 sq ft (56,000 sq m)], a multiplicity of the same types of stores starts to occur: the purpose being to increase the choices available to a customer for any given type of merchandise. Therefore, with increasing shopping center size, the occupant load increases as well, but at a declining rate. In using the table, the occupant load factor is applied to only the gross leasable area utilizing the covered mall as a means of egress.

A-25-2.1.2 Under this paragraph, if the second and third floors of a store building are each required to have three stairways, the second floor may use the stairways serving the third floor so that the total number of stairways required is three, not six.

A-25-2.2.1 This prohibits as required exits, ladders, slide escapes, and any other exit facility not in accordance with the applicable provisions of the *Code*.

A-25-2.5.2 The purpose of this paragraph is to avoid pockets or dead ends of such size as to involve undue danger of persons being trapped in case of fire. It permits small areas such as rooms or alcoves with only one way out where the distance is small enough so that there is little likelihood that a fire might develop to such proportions as to block escape before the occupants become aware of the fire and make their way out.

A-25-2.5.2 Exception It is recognized that excessive dead ends exist and in some cases are impractical to eliminate. The authority having jurisdiction may allow these to continue, taking into consideration any or all of the following:

Tenant arrangement.
Automatic sprinkler protection.
Smoke detection.
Exit remoteness.

A-25-2.5.3 Exception No. 2 It is recognized that excessive common paths of travel exist and in some cases are impractical to eliminate. The authority having jurisdiction may allow these to continue, taking into consideration any or all of the following:

Tenant arrangement.
Automatic sprinkler protection.
Smoke detection.
Exit remoteness.

A-25-2.5.9 It is the intent to provide adequate area for transit and parking of wheeled carts or buggies used by customers to eliminate the obstruction to the means of egress of the interior exit access and the exterior exit discharge. This includes corral areas adjacent to exits that are constructed to restrict the movement of wheeled carts or buggies therefrom.

A-25-2.7 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 25-2.7 should not be confused with open stairways as permitted by 25-3.1 (Exception No. 1).

A-25-2.11.2 The term "principal entrance/exit doors" is intended to imply doors which the authority having jurisdiction can be reasonably assured will be unlocked in order for the facility to do business.

A-25-3.1 See 25-1.7.2 for provisions on determining occupant load for exit purposes where vertical openings are unprotected.

A-25-4.3.1 Exception (b) The minimum requirement for terminating mall exit access in not less than three units of exit width relates to the minimum requirement for at least one aisle in Class A stores [30,000 sq ft (2,800 sq m) or greater] to be 5 ft (152 cm) in width.

A-25-4.3.1 Exception (e) Smoke control systems for covered malls are necessary to maintain the mall reasonably free of products of combustion for at least the duration required to evacuate the building and to minimize migration of products of combustion from one tenant to another. Systems that can be engineered to accomplish this include:

(a) Separate or mechanical exhaust or control systems.

(b) Mechanical exhaust or control systems in conjunction with the heating, ventilating, and air conditioning systems.

(c) Automatically or manually released gravity roof vent devices such as skylights, relief dampers, or smoke vents.

(d) Combinations of (a), (b), and (c) or any other engineered system designed to accomplish the purpose of this section.

A-25-4.3.2.3 It is not the intent of this paragraph to require that large stores be considered anchor stores. A store not considered in determining the occupant load of the mall must be arranged so that all of its means of egress will be independent of the covered mall.

CHAPTER 26

A-26-2.1.3 Under this paragraph, if the second and third floor of a business occupancy building were each required to have three stairways, the second floor may use the stairways serving the third floor so that the total number of stairways required is three, not six.

A-26-2.5.1 Required exits need to be suitably located to allow access without passage through areas subject to locking.

A-26-2.6 The allowance of up to 50 ft (15 m) additional travel into the low-occupancy room, when measured in accordance with Section 5-6, leads to possible cumulative travel distances up to 250 ft (76 m), or 350 ft (107 m) in a building completely protected by an automatic sprinkler system.

A-26-2.11.1 The term "principal entrance/exit doors" is intended to imply doors which the authority having jurisdiction can be reasonably assured will be unlocked in order for the facility to do business.

A-26-3.6.1 Exception No. 1 Where exits are available from an open floor area, such as open plan buildings, corridors need not be separated. (An example of an open plan building is one in which the work spaces and access to exits are delineated by the use of tables, desks, bookcases, counters, or by partitions that are less than floor to ceiling height.)

A-26-3.6.1 Exception No. 2 It is the intent of this paragraph that a single tenant be limited to an area occupied under a single management and working the same hours. The concept being that people under the same employ working the same hours would largely be familiar with their entire tenant space. It is not the intent to apply this just because tenants might be owned by the same organization. For example, in a government-owned office building, the offices of different federal agencies would be considered tenants since an employee normally works for one agency. The agencies may work various hours. Another example, would be a classroom building of a university. Since some classrooms may be being used at times when other classrooms are not being used.

A-26-4.2 In the design of high-rise buildings, special consideration should also be given to a life safety system including, among others, the following features:

Movement of occupants to safety.
Control of fire and smoke.
Psychological features.
Communications.
Elevators (*see A-7-4.1*).
Emergency planning.
Overall system reliability.

CHAPTER 27

A-27-2.1.3 Under this paragraph, if the second and third floor of a business occupancy building were each required to have three stairways, the second floor may use the stairways serving the third floor so that the total number of stairways required is three, not six.

A-27-2.5.1 Required exits need to be suitably located to allow access without passage through areas subject to locking.

A-27-2.5.2 Exception It is recognized that excessive dead ends exist and in some cases are impractical to eliminate. The authority having jurisdiction may allow these to continue, taking into consideration any or all of the following:

Tenant arrangement.
Automatic sprinkler protection.
Smoke detection.
Exit remoteness.

A-27-2.5.3 Exception No. 3 It is recognized that excessive common paths of travel exist and in some cases are impractical to eliminate. The authority having jurisdiction may allow these to continue, taking into consideration any or all of the following:

Tenant arrangement.
Automatic sprinkler protection.
Smoke detection.
Exit remoteness.

A-27-2.6 The allowance of up to 50 ft (15 m) additional travel into the low-occupancy room, when measured in accordance with Section 5-6, leads to possible cumulative travel distances up to 250 ft (76 m), or 350 ft (107 m) in a building completely protected by an automatic sprinkler system.

A-27-2.11.1 The term "principal entrance/exit doors" is intended to imply doors which the authority having jurisdiction can be reasonably assured will be unlocked in order for the facility to do business.

A-27-4.2.2 In some cases appreciable cost may 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 28

A-28-1.4.3 High hazard occupancy may include occupancies where gasoline and other flammable liquids are handled, used, or are stored under such conditions as to involve possible release of flammable vapors; where grain dust, wood flour or plastic dusts, aluminum or magnesium dust, or other explosive dusts may be produced; where hazardous chemicals or explosives are manufactured, stored, or handled; where cotton or other combustible fibers are processed or handled under conditions such as to produce flammable flyings, and other situations of similar hazard.

Chapter 28, Industrial Occupancies, and Chapter 29, Storage Occupancies, include detailed provisions on high hazard occupancy.

A-28-1.7 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 exit capacity for all occupants, except cases of unusual arrangement of buildings or high occupant load of a general manufacturing occupancy.

A-28-2.2 Exception No. 3 The customary requirement of building codes for fire doors on both sides of an opening in a fire wall may be met by having an automatic sliding fire door on one side, and 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-5-2.4.3.4.)

A-28-2.3.2 Greater corridor widths are required wherever necessary to accommodate the travel through the number of units of exit width served thereby and under special conditions as elsewhere specified.

A-28-2.5.1 Unless exits are suitably located, this requirement may interfere with the practice in multiple tenant manufacturing buildings of renting a wing or large section to a single tenant who closes the corridor with a door subject to locking and treats the corridor inside the door as part of his manufacturing space. No required exit may be blocked by a door subject to locking against the exit travel.

A-28-2.6.2(e) Smoke and heating venting should be in accordance with NFPA 204, *Guide for Smoke and Heat Venting* (*see Appendix B*).

A-28-2.7 The basis for this 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.

A-28-3.2 Emergency lighting should be considered where operations require lighting to perform orderly manual emergency operation or shut down, maintain critical services, or provide safe start-up after a power failure.

CHAPTER 29

A-29-1.5 Section 4-2 does not recognize low hazard storage occupancy except where the storage structure is noncombustible and the interior finish Class A.

A-29-2.2 Exception The customary requirement of building codes for fire doors on both sides of an opening in a fire wall may 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-5-2.4.3.4.)

A-29-2.6.1 The travel distance to exits specified contemplate a low population density. Consideration should be give to locating areas which 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-29-6 For further information on aircraft hangars, see NFPA 409, *Standard on Aircraft Hangars* (*see Appendix B*).

A-29-7 For further information, see NFPA 61B, *Standard for the Prevention of Fire and Dust Explosions in Grain Elevators and Bulk Grain Handling Facilities* (*see Appendix B*). The exit requirements for storage elevators are based upon the possibility of fire and are not based upon the possibility of grain dust explosions.

A-29-8.1.1 For further information on garages, including a definition of "open garage," see NFPA 88A, *Standard for Parking Structures* (*see Appendix B*).

A-29-8.2.5.3 Gasoline dispensing inside buildings presents inherent hazards that are avoided with outdoor dispensing, as in ordinary gasoline filling stations.

NFPA 88A, *Standard for Parking Structures*, and NFPA 88B, *Standard for Repair Garages* (*see Appendix B*) restrict all indoor automobile fueling facilities.

CHAPTER 30

A-30-1.3.4 In determining openings in exterior walls, doors or access panels may be included. Windows may also be included if they are openable or provide a breakable glazed area.

A-30-2.2 Escape chutes, controlled descent devices and elevators may provide escape routes in unusual structures; however, they should not be substituted for the provisions of this *Code*.

A-30-2.4 Exception No. 3 The Washington Monument, Washington, D.C., is an example of a tower where it would not be practicable to provide a second stairway.

NFPA 220, *Standard on Types of Building Construction* (*see Appendix B*), defines types of construction.

A-30-2.5.3 For further information on pier fire protection, see NFPA 87, *Standard for the Construction and Protection of Piers and Wharves* (*see Appendix B*).

A-30-6 Exits and other fire safety standards for trailers will be found in NFPA 501A, *Standard for the Installation of Mobile Homes* (*see Appendix B*).

A-30-7.1.2 In an area from which there is no direct access to outside and no windows to permit outside fire department rescue operations and ventilation, any fire or smoke may tend to produce panic. Such conditions may occur in either underground structures or windowless buildings.

CHAPTER 31

A-31-1.3.5 NFPA 13A, *Recommended Practice for Care and Maintenance of Sprinkler Systems* (*see Appendix B*), gives detailed information on maintenance procedures.

A-31-1.3.6 NFPA 72H, *Guide for Testing Procedures for Protective Signaling Systems*, gives detailed information on testing procedures.

A-31-1.4.1 For details of flame retardant treatments and tests thereof, see NFPA 701, *Standard Method of Fire Tests for Flame Resistant Textiles and Films* (*see Appendix B*). Furnishings and decorations tested in accordance with this standard should comply with both the small- and large-scale tests.

A-31-1.4.2 Christmas trees not effectively flame retardant treated, ordinary crepe paper decorations, and pyroxylin plastic decorations may be classed as highly flammable.

A-31-1.5 The term "fire exit drill" is used to avoid confusion between drills held for the purpose of rapid evacuation of buildings and drills of fire fighting practice which, from a technical viewpoint, are correctly designated as "fire drills" although this term is by common usage applied to egress drills in schools, etc.

The purpose of fire exit drills is to ensure the efficient and safe use of the exit facilities available. Proper drills ensure orderly exit under control and prevent the panic which has been responsible for the greater part of the loss of life in the major fire disasters of history. Order and control are the primary purposes of the drill. Speed in emptying buildings, while desirable, is not in itself an object, and should be made secondary to the maintenance of proper order and discipline.

The usefulness of a fire exit drill and the extent to which it can be carried depends upon the character of the occupancy, it being most effective in occupancies where the occupant load of the building is under discipline and subject to habitual control. For example, schools offer possibilities of more highly developed and valuable fire exit drills than other types of occupancy.

In buildings where the occupant load is of a changing character and not under discipline, for example, in hotels or in department stores, no regularly organized fire exit drill, such as that which may be conducted in schools, is possible. In such cases the fire exit drills must be limited to the regular employees who, however, can be thoroughly schooled in the proper procedure and can be trained to direct properly other occupants of the building in case of fire. 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 fire exit drills can be held.

A-31-1.5.5 If a fire exit drill is considered merely as a routine exercise from which some persons may be excused, there is a grave danger that in an actual fire the drill will fail in its intended purpose.

A-31-1.5.6 Fire is always unexpected. If the drill is always held in the same way at the same time it loses much of its value, and when for some reason in actual fire it is not possible to follow the usual routine of the fire exit drill to which occupants have become accustomed, confusion and panic may ensue. Drills should be carefully planned to simulate actual fire conditions. Not only should they be held at varying times, but should use different means of exit, assumption being made, for example, that some given stairway is unavailable by reason of fire or smoke, all the occupants being led out by some other route. Fire exit drills should be designed to familiarize the occupants with all available means of exits, particularly emergency exits that are not habitually used during the normal occupancy of the building.

A-31-2.1 Attention is directed to the importance of having an adequate number of competent attendants at all times when the assembly occupancy is occupied.

A-31-2.2 It is not the intent of this provision to require an announcement in bowling alleys, cocktail lounges, restaurants or places of worship.

A-31-2.3 Exception No. 1 Securely supported altar candles in churches, well separated from any combustible material, may be permitted. On the other hand, lighted candles carried by children wearing cotton robes present a hazard too great to be permitted even for the most worthy cause. There are many other situations of intermediate hazard where the authority having jurisdiction will have to exercise judgment.

A-31-3.1.1 The requirements are of necessity general in scope, as it is appreciated they must apply to all types of schools as well as conditions of occupancies, such as truant schools, schools for mentally handicapped, the blind, deaf, and dumb, 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 some school authorities to issue supplements to these requirements, but all supplements should be consistent with these requirements.

A-31-3.1.2 "Practice drills" may be held during inclement weather. Such drills would be held at the regular dismissal time, when the pupils are fully clothed, by using the exit drill alarm signal. With such drills there would be no necessity of a return signal.

A-31-3.1.3 Cards of instruction should be conspicuously posted describing the procedure of the drills.

A-31-3.1.4 If, for any reason, a line becomes blocked, some of the pupils should be countermarched to another exit in order to prevent panic conditions arising as a result of inactivity.

A-31-3.1.8 Wherever possible, drill lines should not cross a street or highway, especially where the traffic is heavy. It is recommended that, where drill lines must cross roadways, a police officer, school janitor, or a teacher acting as a traffic officer be on duty to control traffic during drills.

A-31-3.1.9 Instructors and employees should be trained in the function and use of such equipment to meet an emergency.

A-31-3.3.1 Particular attention should be given to keeping all doors unlocked, having doors closed which serve to protect the safety of paths of egress (such as doors on stairway enclosures) and under no conditions blocked open, 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 which might prevent the opening of the door or interfere with rapid escape from the building.

Any condition likely to interfere with safe exit should be immediately corrected if possible; otherwise, reported at once to the appropriate authorities.

A-31-3.4.2 It is recommended that firesafety be a part of the educational program of the center.

A-31-4 Health care occupants have, in large part, varied degrees of physical disability, and their removal to the outside or even disturbance by moving is inexpedient or impractical in many cases, except as a last resort. Similarly recognizing that there may be an operating necessity for the restraint of the mentally ill (often by use of barred windows and locked doors), exit drills are usually extremely disturbing, detrimental, and frequently impracticable.

In most cases, fire and 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, must be relied upon to reduce the occasion for evacuation of buildings of this class to a minimum.

A-31-4.1.3 Many hospitals conduct fire exit drills without disturbing patients by advance planning in the choice of location of the simulated emergency and closing 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 the efficiency, knowledge, and response of institutional personnel. Its purpose is not to disturb or excite patients.

Convalescent patients should be removed from involved zones lest their curiosity or anxiety hamper fire brigade activity, or cause themselves injury. All sections should be assured of a necessary complement of doctors, nurses, attendants, and other employees in reserve in readiness to assist in the transfer of bed patients to less exposed areas or sections.

A-31-4.2.1 Each facility has specific characteristics that may vary from other facilities sufficiently 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 alarm station.

(b) If a person is not involved in the fire, the discoverer should activate the building fire alarm using the nearest manual alarm station.

(c) Personnel, upon hearing the alarm signal, should immediately execute their duties as outlined in the facility firesafety 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 the prompt notification of the fire location to the facility telephone operator.

(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 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 to the fire department and alert the building occupants.

A-31-4.4 The most rigid discipline with regard to prohibition of smoking may not be nearly so 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, variable with different types and arrangement of buildings; and the effectiveness of rules of procedure, necessarily flexible, depends in large part upon the management.

A-31-4.5 Furniture and furnishings, including mattresses, are recognized as providing combustibles for the support of fire and, as such, appropriate measures should be taken to protect the facility and occupants from immediate danger.

A-31-4.5.2 Furniture, including mattresses, are recognized as providing combustibles for the support of fire and, as such, appropriate measures should be taken to protect the facility and occupants from immediate danger.

A-31-4.5.3 Decorations meeting the requirements of this paragraph should pass both the large- and small-scale tests of NFPA 701, *Standard Method of Fire Tests for Flame Resistant Textiles and Films* (*see Appendix B*).

A-31-5.1.2 This can be met by electronic or oral monitoring systems, visual monitoring, call signals, or other means.

A-31-5.4.2 Decorations meeting the requirements of this paragraph should pass both the large- and small-scale tests of NFPA 701, *Standard Method of Fire Tests for Flame Resistant Textiles and Films* (*see Appendix B*).

A-31-6.1.1 The exact nature of this emergency organization must of necessity be governed by such factors as the number of available employees, the structural conditions, the degree of compliance with this *Code*, and other elements pertinent to the individual situation.

In order to be efficient, any such organization must depend upon:

(a) A definite working plan.

(b) Competent leadership.

(c) Rigid discipline.

(d) Maintenance of necessary apparatus.

(e) A schedule of sufficient training under discipline with such apparatus.

It will be found advisable to secure the cooperation of local fire department officials in developing and training such an organization of employees.

A-31-6.1.2 It is recommended that emergencies be assumed to have arisen at various locations in the occupancy, in order to train employees in logical procedures.

Appendix B Referenced Publications

B-1 The following documents or portions thereof are referenced within this *Code* for informational purposes only and thus should not be considered part of the requirements of this *Code*. The edition indicated for each reference is current as of the date of the NFPA issuance of this document. These references are listed separately to facilitate updating to the latest edition by the user.

The numbers in parentheses represent the paragraph numbers from the Appendices of this *Code* which reference, in an advisory manner, the given publication.

B-1.1 NFPA Publications. National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

NFPA 10-1985, *Standard for Portable Fire Extinguishers* (A-7-7.4.1)

NFPA 11-1983, *Standard for Low Expansion Foam and Combined Agent Systems* (A-7-7.3)

NFPA 12-1985, *Standard on Carbon Dioxide Extinguishing Systems* (A-7-7.3)

NFPA 12A-1980, *Standard on Halon 1301 Fire Extinguishing Systems* (A-7-7.3)

NFPA 12B-1980, *Standard on Halon 1211 Fire Extinguishing Systems* (A-7-7.3)

NFPA 13-1985, *Standard for the Installation of Sprinkler Systems* (A-4-2.2.1, Appendix E, Appendix G)

NFPA 13A-1981, *Recommended Practice for the Care and Maintenance of Sprinkler Systems* (A-31-1.3.5)

NFPA 13D-1984, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Mobile Homes* (A-20-1.5.1, A-21-3.2.2.6, Appendix G)

NFPA 15-1985, *Standard for Water Spray Fixed Systems for Fire Protection* (A-7-7.3)

NFPA 17-1985, *Standard for Dry Chemical Extinguishing Systems* (A-7-7.3)

NFPA 30-1981, *Flammable and Combustible Liquids Code* (A-12-3.2.1)

NFPA 56F-1983, *Standard for Nonflammable Medical Gas Systems* (A-12-3.2.1)

NFPA 61B-1980, *Standard for the Prevention of Fires and Explosions in Grain Elevators and Facilities Handling Bulk Raw Agricultural Commodities* (A-29-7)

NFPA 68-1978, *Guide for Explosion Venting* (A-6-4.2)

NFPA 70-1984, *National Electrical Code* (A-5-9.2.2, A-5-9.2.3, A-16-5.3)

NFPA 71-1982, *Standard for the Installation, Maintenance and Use of Central Station Signaling Systems* (A-7-7.2.1)

NFPA 72A-1985, *Standard for the Installation, Maintenance and Use of Local Protective Signaling Systems* (A-7-6.1.2, A-7-7.2.1, Appendix G)

NFPA 72B-1979, *Standard for the Installation, Maintenance and Use of Auxiliary Protective Signaling Systems* (A-7-7.2.1, Appendix G)

NFPA 72C-1982, *Standard for the Installation, Maintenance and Use of Remote Station Protective Signaling Systems* (A-7-7.2.1, Appendix G)

NFPA 72D-1979, *Standard for the Installation, Maintenance and Use of Proprietary Protective Signaling Systems* (A-7-7.2.1, Appendix G)

NFPA 72E-1984, *Standard on Automatic Fire Detectors* (Appendix E, Appendix G)

NFPA 72H-1984, *Guide for Testing Procedures for Local, Auxiliary, Remote Station and Proprietary Protective Signaling Systems* (A-31-1.3.6)

NFPA 80-1983, *Standard for Fire Doors and Windows* (A-5-1.3.3, A-5-2.4.3.2, A-6-2.2.5)

NFPA 87-1980, *Standard for the Construction and Protection of Piers and Wharves* (A-30-2.5.3)

NFPA 88A-1985, *Standard for Parking Structures* (A-29-8.1.1, A-29-8.2.5.3)

NFPA 88B-1985, *Standard for Repair Garages* (A-29-8.2.5.3)

NFPA 90A-1985, *Standard for the Installation of Air Conditioning and Ventilating Systems* [A-6-2.2.8(c), A-7-3.1, Appendix G]

NFPA 99-1984, *Standard for Health Care Facilities* (A-12-3.2.1)

NFPA 204M-1982, *Guide for Smoke and Heat Venting* [A-28-2.6.2(e)]

NFPA 220-1979, *Standard on Types of Building Construction* (A-3-2, A-6-2.1, A-10-3.3.1, A-11-3.3.1, A-30-2.4, Appendix C, Appendix E)

NFPA 251-1985, *Standard Methods of Fire Tests of Building Construction and Materials* (Appendix C)

NFPA 252-1984, *Standard Methods of Fire Tests of Door Assemblies* (Appendix C)

NFPA 253-1984, *Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source* (A-12-3.3.2)

NFPA 255-1984, *Standard Method of Test of Surface Burning Characteristics of Building Materials* (A-6-5.2.1, A-6-5.2.2, A-6-5.2.4, Appendix E, Appendix G)

NFPA 259-1982, *Standard Test Method for Potential Heat of Building Materials* (A-3-2)

NFPA 409-1979, *Standard on Aircraft Hangars* (A-29-6)

NFPA 501A-1982, *Standard for Mobile Home Parks* (A-30-6)

NFPA 701-1977, *Standard Methods of Fire Tests for Flame-Resistant Textiles and Films* (A-6-5.2.2, A-31-1.4.1, A-31-4.5.3, A-31-5.4.2)

NFPA 901-1981, *Uniform Coding for Fire Protection* (A-4-1.1)

NFPA 1221-1984, *Public Fire Service Communications* (A-7-7.2.1)

NFPA FPH1581, *NFPA Fire Protection Handbook*, 15th Edition, 1981 (A-7-3.1, A-7-7.1.1, A-12-3.2.2, A-13-3.2.2)

NFPA SPP-53, Butcher and Parnell, *Smoke Control in Fire Safety Design* [A-6-2.2.3.5(f), A-7-3.1]

B-1.2 Other Publications.

ASHRAE—*Handbook of Fundamentals*, American Society of Heating Refrigeration, and Air Conditioning Engineers, 345 East 47th Street, New York, NY 10017 (advisory only — use most recent edition) (A-5-2.3.2)

ANSI/ASME A17.1-1984, *Safety Code for Elevators and Escalators*, American Society of Mechanical Engineers, 345 East 47th St., New York, NY 10017 (A-7-4.1)

ANSI A117.1-1961, *Specifications for Making Buildings and Facilities Accessible to, and Usable by, the Physically Handicapped*, American National Standards Institute, 1430 Broadway, New York, NY 10018 (Reaff. 1971) (A-2-10, A-10-1.1.3)

ANSI/IES RP1-1973, *Practice for Office Lighting*, Illuminating Engineering Society, 345 East 47th Street, New York, NY 10017 (A-5-8.1.1)

ANSI/IES RP3-1977, *Guide for School Lighting*, Illuminating Engineering Society, 345 East 47th Street, New York, NY 10017 (A-5-8.1.1)

ANSI/IES RP7-1979, *Practice for Industrial Lighting*, Illuminating Engineering Society, 345 East 47th Street, New York, NY 10017 (A-5-8.1.1)

IES RP2-1976, *Recommended Practice for Lighting Merchandising Areas*, Illuminating Engineering Society, 345 East 47th Street, New York, NY 10017 (A-5-8.1.1)

Templer, J., Mullet, G., Archea, J., and Margulis, S., *An Analysis of the Behavior of Stair Users*, National Bureau of Standards NBS BSS 120. Available from National Technical Information Service (NTIS), Springfield, VA 22151 (A-5-2.2.2.1, A-5-2.4.4)

Fitch, J., Templer, J., and Corcoran, P., *The Dimensions of Stairs*, Scientific American, Oct. 1974, pp. 82-90 (A-5-2.2.2.1)

Klote and Fothergill, *Design of Smoke Control Systems for Buildings*, ASHRAE, 345 East 47th Street, New York, NY 10017 (A-7-3.1)

FF1-70, *Standard for the Surface Flammability of Carpets and Rugs (Pill Test)* (A-6-5.3.2)

APPENDIX C
FIRESAFETY EVALUATION SYSTEM FOR HEALTH CARE OCCUPANCIES

This Appendix is not a part of the requirements of this NFPA Code, but is included for information purposes only. The term "shall" in this Appendix is used to indicate that if one chooses to use the Appendix, then, within the system described, the item is mandatory.

This Appendix describes a system for determining the relative level of safety for new or existing health care facilities as compared to explicit conformance with the applicable requirements of Chapters 1 through 31. This system considers mixes and arrangements of safeguards most of which are described in detail in Chapters 1 through 31.

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Procedure for Determining Equivalency.

1. Using the "Fire/Smoke Zone Evaluation Work Sheet for Health Care Facilities" (dated 1/85, 1985 *Life Safety Code*) (Tables C-1 through C-7), evaluate every fire zone.* Use the manual portion of this Appendix as a guide.

2. Using the "Facility Fire Safety Requirements Work Sheet" (Table C-8), determine any nonconformance with the requirements listed on the work sheet.

*A fire/smoke zone is a space separated from all other space by floors, horizontal exits, or smoke barriers. Where a floor is not subdivided by horizontal exits or smoke barriers the entire floor is a single zone. The entire facility shall be divided into zones. There shall be no areas that are not in a zone.

3. Equivalency is achieved if the fire/smoke zone evaluations show equivalency or better in each and every fire zone and the requirements on the Facility Requirements Work Sheet (Table C-8) are met.

This Appendix is provided to assist in completion of the Fire/Smoke Zone Evaluation Work Sheet for Health Care Facilities. The step by step instructions for the mechanics of completing the work sheet are included in the work sheet itself. They are not repeated in this Appendix. This Appendix provides expanded discussion and definition of the various items in the work sheet to assist the user when questions of definitions or interpretation arise. The manual is organized to progressively follow the format of the work sheet.

NOTE: The paragraph references within this manual are to this edition of the *Life Safety Code*.

Fire/Smoke Zone. A fire/smoke zone (zone) is a space which is separated from all other spaces by floors, horizontal exits, or smoke barriers. Where a floor is not subdivided by horizontal exits or smoke barriers the entire floor is the zone.

NOTE: Patient sleeping rooms or suites exceeding 1,000 sq ft (92.9 sq m) of floor area should be evaluated as follows:

(a) If the room or suite has a single exit access door, it should be evaluated as a single dead-end zone.

(b) If the room has two or more exit access doors, it should be evaluated as either a room in a zone or as a separate zone, whichever gives the better (higher) rating.

Selection of Zones to Be Evaluated. For a complete evaluation, every zone in the health care facility should be evaluated individually. From a practical standpoint most health care facilities have repetitive arrangements so that a complete picture can be developed by evaluating typical zones until all combinations are evaluated. The zones selected should include:

(a) Each type of patient zone having a different type of mobility, density, or attendant ratio as classified in Table C-1 of the work sheet.

(b) Each zone that represents a significantly different type of construction, finish or protection system.

(c) Zones containing special medical treatment or support activities (operating suites, intensive care units, laboratories).

(d) Zones not involving housing, treatment, or customary access for patients as follows:

1. Any zone, whether used for patient egress or not, may be evaluated on the same basis as a patient use zone. In such case the value of factor F in Table C-2 shall be assigned the value of factor L (Fire Zone Location) from Table C-1. In such cases, Item 10, Emergency Movement Routes shall be graded "Deficient Capacity" if the exit capacity is less than that prescribed for the actual occupancy of the space as "< 2 routes" if less than 75 percent of the prescribed exit capacity is present.

2. If the zone is separated from all patient use zones by 2-hour fire-rated construction (including any members that bear the load of a patient zone and with Class B fire doors on any communicating openings), it may be excluded from evaluation. In such case, that space shall conform with the portion of the *Life Safety Code* appropriate to its use. In addition, appropriate charges under Item 8, Hazardous Areas, in Table C-4 shall be charged against other zones in the facility.

Maintenance.

Any protection system, requirements, or arrangement which is not maintained in a dependable operating condition or is used in such a manner that the intended firesafety function or hazard constraint is impaired should be considered as defective and receive no credit in the evaluation.

Occupancy Risk (Table C-1).

General Discussion. In establishing a system for evaluating occupancy risk, it is recognized that:

(1) There is a basic level of risk inherent in every health care facility;

(2) The fuel characteristics of furniture, equipment, and supplies vary with time; and

(3) The arrangement of these items within the space available also may vary with time.

Consequently, these three factors are not included as parameters in a safety equivalency measurement. To account for these factors, the occupancy risk base line is set at the inherent risk level with the presumption that the furniture, equipment, and supplies will be the most combustible and adversly located (from a firesafety standpoint) of those normally found in health care facilities.

1. *Patient Mobility.*

The single most important factor controlling risk in a health care facility is the degree to which patients must be assisted in taking actions necessary for their safety. The level of capability in health care facilities will vary from patients who, if informed or directed, will be able to take positive self-protecting actions to those patients who have no ability to move or even to take the simplest actions to safeguard themselves. In some cases, patients may be directly connected to a fixed life support system and so intimately dependent upon it that regardless of their physical condition or the availability of assistance they cannot be moved without jeopardy of death or serious harm. In the measurement of occupancy risk factors, the least mobile category of patient expected in the zone determines the risk factor for that zone. The rationale for this approach is that if a zone accepts any patient with a reduced mobility status it may at any time increase the number of those patients. The impact of this approach will be that most health care facilities will be rated in the "not mobile" risk category.

Mobility Status Factor. Patient mobility status is based on the capability of each patient to take actions necessary to protect himself. The four classes are defined as follows:

(a) *Mobile.* Capable of readily rising from bed and taking self-protecting actions at approximately the same rate as a healthy adult. In order to be classified as mobile the patient must not require assistance in getting out of bed and must be able to open a closed or locked door. Mobile persons when sleeping shall be considered as mobile if they are not restrained or in any other way reduced in response capabilities so that the type of arousal mechanism that would normally awaken an adult would not be affected.

(b) *Limited Mobility.* Those patients who have all of the capabilities of a mobile person except that their rate of travel will be significantly less.

(c) *Not Mobile.* Incapable of removing themselves from danger exclusively by their own efforts. Examples would include persons who are totally bedridden, who require assistance to get out of bed or to move, or who are restrained, locked in their rooms, or otherwise prevented from taking complete emergency self-protection evacuation actions without assistance. Mobility status should be based on the minimum level of mobility in an average 24-hour period.

(d) *Not Moveable.* Not capable of being moved from the room in which they are housed through the course of a fire. Examples would include patients attached to life support systems or involved in medical or surgical procedures that prohibit their immediate relocation without extreme danger of death or serious harm.

2. *Patient Density.*

The occupancy risk evaluation for occupancy density (number of patients within the zone) measures both the inherent increase in the maximum fire death potential that occurs as the number of patients in a zone increases, and the problems involved by a limited staff in handling larger numbers of patients during an emergency.

Patient Factor. The density of patients is the number of patients that could potentially be housed in the zone. The patient count should be based on the number of assignable beds in the zone on the assumption that they may all be occupied at the time of the fire emergency.

3. *Zone Location.*

This risk factor relates to fire department accessibility to a fire. The rating system recognizes the inherent advantages for the first floor zone. It also recognizes the problems of evacuation from higher floors and the virtual impossibility of using external fire fighting efforts above the sixth floor in any building.

Floor Factor. The measured zone's location shall be considered to be on floor one if the floor has direct access to the exterior at or within less than one-half floor height above or below grade. If a building is on a sloping grade, each floor that has such exterior access shall be considered as a first floor situation for measurement of fire zones on those floors. The measured zone shall be considered on the second to third floor range, and the fourth to sixth floor range, based on the height of the zone above the nearest grade floor. The zone shall be considered to be above the sixth floor if it is more than six floors above the nearest grade floor. The risk factor value for zones in basements is the same as for zones at or above the seventh floor. The problems involved in emergency internal access, fire fighting and rescue, and the inability to make external attack in basements is approximately equivalent to that in upper stories of buildings.

4. *Ratio of Patients to Attendants.*

This risk factor recognizes the importance of patient safety of a staff immediately available to respond in an emergency. The emergency actions that may be undertaken by the staff include detection, alarm, fire extinguishment, confinement of the fire, establishing barriers between the patients and the fire (closing patient room doors), rescue, emergency medical aid, and other related functions. A few of these functions, such as detection and alarming, may not be critically related to the ratio of nursing staff to patients while those related to rescue and the closing of patient room doors have a strong relationship to the staffing ratio. The staff ratio considered is based on the minimum staffing level immediately available (normally night hours).

Patient-Attendant Factor. The ratio of patients to attendants is based on those patients in the fire/smoke zone and the immediately available attendant staff. In calculating the ratio, it shall be based on the minimum staffing level (usually occurring in the night shift). Where nursing stations or other

positions of attendants are located at the junction of two or more zones and the location of the station is such that each of the zones has immediate access and view of the nursing station, then the total staffing assigned to the nursing station can be credited to each of the zones. An exception is where staff members are bound by duty assignments (cardiac care units, infant nurseries, operating suites, etc.) that prevent them from responding to other than their assigned zone.

The evaluation system assesses a charge of 4.0 to this risk factor in any case where there are periods when there are no attendants immediately available to a zone that houses patients.

5. *Patient Average Age.*

This risk factor recognizes the increased susceptibility of the elderly and of infants up to one year of age to physical harm by smoke particles, gaseous combustion products and heated air. This rating assigns a larger risk factor to zones occupied by a population whose average age is above 65 or below one year. Basically, imposition of this charge demands additional safety protection in nursing homes for the aged and nurseries.

Age Factor. The mode value is used to arrive at the age factor for the patients in the zone. The calculation should be based on the past record of occupants assigned to the zone. Patients under one year old are classified at the same risk level as those over 65. This is in recognition of the fire susceptibility of infants.

Safety Parameters (Table C-4).

General Discussion. The safety parameters are a measure of those building factors that bear upon or contribute to the safety of those persons (patients, staff, visitors, others) who may be in the particular zone at the time of a fire.

Each of the safety parameters was analyzed. Where the current *Code* requirements recognize several different approaches to the parameter, the most important alternatives were listed. In addition, conditions likely to be encountered in situations failing to meet the explicit *Code* requirements and conditions exceeding those required by the *Code* but available for increased protection were also listed.

1. *Construction.*

Construction types are classified in accordance with the definitions of NFPA 220, *Standard on Types of Building Construction* (*see Appendix B*). Major revisions have been made in the titles and definitions in NFPA 220, *Standard on Types of Building Construction*, as compared to prior editions of that standard.

NOTE: Prior editions of NFPA 220 included requirements for "interior partitions enclosing stairs or other openings through floors." The current edition deletes this requirement. This change is fully accounted for in this system through Safety Parameter Item 7, Vertical Openings.

Where the facility includes additions or connected structures of different construction, the rating and classification of the structure shall be based on (a) separate buildings if a 2-hour or greater fire-rated separation exists between the portions of the building, (b) separate buildings if the additions and connected structure conform to the provisions of applicable sections of Chapter 12 or 13, whether or not separation is provided, and (c) the lower safety parameter point score involved if such a separation does not exist.

The floor level used to determine the parameter value is the floor of the fire zone being evaluated. The "floor of zone" is the story height above the floor of primary level of exit discharge as defined by 12-1.6.1 and 13-1.6.1.

When the zone is on a floor below the floor of lowest discharge, the construction value shall be based on the distance of that floor from the closest level of discharge, i.e., one floor below discharge = "Second"; two floors below discharge = "Third"; three or more floors below discharge = "Fourth and above."

2. *Interior Finish (Corridor and Exit).*

The classification of flame spread for corridor and exits is in accordance with the categories specified in 6-5.2. The flame spread classification shall be based on the most combustible surface after deleting trim. No allowance is made in the safety parameter values for Class D or E interior finishes. It is not anticipated that such material will be used in health care facilities. In the rare case such high flame spread interior finish material is involved, an individual appraisal outside the capability of this evaluation system will be required.

3. *Interior Finish (Rooms).*

The same classification of interior finish applies to rooms as applies to corridors and exits. The specific definitions are given in 6-5.2. The flame spread classification shall be based on the most combustible surface after deleting trim. No consideration is included in the safety parameter values for Class D or E interior finishes. It is not anticipated that such material will be used in health care facilities. In the rare case such high flame spread interior finish material is involved, an individual appraisal outside of the capability of this evaluation system will be required.

4. *Corridor Partitions/Walls.*

For the purpose of this evaluation, the fire-rated partitions considered are as defined in 12-3.6 for new buildings and 13-3.6 for existing buildings. All elements of the partition, except the door (considered as a separate element in this evaluation), must be included in the determination of its time-rated fire resistance classification, according to NFPA 251, *Standard Methods of Fire Tests of Building Construction and Materials* (*see Appendix B*). An exception to the general rule of evaluating doors separate from walls occurs when one or more rooms has no door (*see Safety Parameter Item 5*). In this instance it is considered that the worth of the fire resistance capabilities of the corridor partition wall is so reduced that the wall should be graded as having no fire resistance. The mechanism for doing this is incorporated into the Fire Safety Evaluation Work Sheet.

Corridor partitions shall be graded as "none or incomplete" if they do not meet the requirements of 12-3.6 or 13-3.6 as appropriate, including applicable Exceptions. In existing buildings, partitions may be graded as "$<$ ⅓ hour" if the ceiling within the fire/smoke zone is of a design and construction to resist the passage of smoke and the partition either extends through or terminates at the underside of the ceiling with a smoketight joint.

Corridor partitions shall be graded as "$\geq$ ⅓ $<$ 1.0 hour" or "$\geq$ 1.0 hour" only when the partitions extend to the underside of the floor or roof construction above in accordance with 12-3.6 or 13-3.6, as appropriate.

5. *Doors to Corridor.*

The classification of doors to the corridor shall be based on the minimum quality of any door in the zone, and the classification shall be determined in accordance with NFPA 252, *Standard Methods of Fire Tests of Door Assemblies* (*see Appendix B*). Doors for protection of hazardous areas and stairwells are not included in this evaluation. They are covered separately in Safety Parameter Items 7 and 8.

(a) *No Door.* A room shall be considered as not having a door if there is no door in the opening or if there is some other mechanism which prevents closing of the door or otherwise leaves a significant opening between the patient room and the corridor. Doors with louvers or ordinary glass lights[1] shall be classified as "no door." Doors which have been blocked open by door stops, chocks, tie backs or other devices which require manual unlatching or releasing action to close the door shall be classified as "no door." Also, doors that are not provided with a latch suitable for keeping the door tightly closed shall be classified as "no door."

(b) *Door Less than Twenty Minute Fire Protection Rating (< 20 Min. FR).* Doors which are not deficient as described in (a), but which do not meet the requirements for (c) below, will be classified as less than 20 minute fire protection rating.

(c) *Door Twenty Minute or More Fire Protection Rating (≥ 20 Min. FR).* Doors shall be considered as having 20 minutes or greater fire protection rating if they are of 1¾-in. (4.4-cm) thick solid bonded wood core construction or any other arrangement of equal or greater stability and fire integrity. The thermal insulation capability of the door is not considered. Hollow or sheet steel doors therefore meet the 20-minute requirement.

(d) *Twenty Minute or More Fire Protection Rating and Automatic Closing (≥ 20 Min. FR & Auto Closing).* Automatic closing devices shall be considered present if the door has an arrangement which holds them open in a manner such that they will be released by a smoke detector operated device (e.g., magnetic or pneumatic hold open device) prior to the passage of significant smoke from a room of fire origin into the corridor or from the corridor into a room not involved in the fire. Smoke detectors for operation of such doors may be integral with the door closers, mounted at each opening, or operated from systems meeting the requirements for 2 or more point credit under Safety Parameter Item 12, Smoke Detection and Alarm. The requirement for 20 minute fire protection rating is the same as in (c) above.

Self-Closing Patient Room Doors. Traditional self-closing doors on individual patient rooms shall be evaluated in the following manner:

(1) If it can be established that the doors are constantly kept in the normally closed position except when persons are actually passing through the openings, the self-closing device shall be considered as equal to an automatic closing device and credited accordingly.

(2) If the self-closing doors are blocked open they shall be classified as "no door" and a charge of (–10) invoked.

6. *Zone Dimensions.*

Zone length is the greatest straight line dimension of the fire/smoke zone. (*See 12-3.7.1 or 13-3.7.1.*)

The length of a corridor "dead end" shall be measured from the point at which a person egressing from the dead end would have an option of egressing in two separate directions.

In assessing the values for this parameter, a single value will be chosen based on the poorest safety level in the zone. For example, if one or more dead ends in excess of 50 ft (15 m) exists, the charge for dead ends (–4) shall be applied regardless of the actual corridor lengths.

Since dead-end corridors and single emergency movement routes (covered in Item 10, Emergency Movement Routes) will each confine the occupants of a fire zone to a single means of egress, the charges for these two items are not cumulative. As indicated by the footnote on the safety parameter values page (Table C-4) in the Fire Safety Evaluation Work Sheet, the charge for dead-end corridors is to be a value of 0 instead of either (–2), (–4) or (–6) in the special case where a charge of (–8) is assessed under Item 10 for single emergency movement routes.

7. *Vertical Openings.*

These values apply to vertical openings and penetrations including exit stairways, ramps and other vertical exits of the type recognized by the *Life Safety Code*, pipe shafts, ventilation shafts, duct penetrations, and laundry and incinerator chutes. Enclosures shall be of construction having fire resistance not less than that prescribed for vertical openings (*see Safety Parameter Item 7*). In addition, they shall be equipped with fire doors or acceptable protection of openings into the shafts, all designed and installed so as to provide a complete barrier to the vertical spread of fire or smoke. A vertical opening or penetration shall be considered "*open*" if it is: (a) unenclosed; (b) is enclosed but does not have doors; (c) is enclosed but has openings other than doorways; and (d) is enclosed with cloth, paper or similar materials without any sustained flame-stopping capabilities.

Where vertical openings are located outside the fire/smoke zone and the separation between the zone and the vertical opening is of 1-hour or greater fire resistance and is of higher fire resistance than the protection of the vertical opening itself (for example: an open shaft separated from the zone by a 2-hour fire-resistant partition with Class B self-closing fire doors), the rating of this factor for the zone being measured shall be based on the higher of the two fire resistant categories. In the above example, a safety parameter value of "3" would be given for the 2-hour fire resistance. When this occurs, however, the space with the vertical opening cannot be considered as an exit route or refuge area for that zone when considering Safety Parameter Item 10, Emergency Movement Routes.

A vertical opening shall be considered as open for greater than three floors if there is unprotected penetration of four or more floors on the same shaft without an intervening slab or other cutoff. (*See also same area as an unprotected penetration covered in the discussion of Item 13, Automatic Sprinklers.*) If a shaft is enclosed at all floors but one and this results in an unprotected opening between that shaft, and one and only one fire/smoke zone, the parameter value assigned for that shaft opening in that fire/smoke zone shall be "0".

8. *Hazardous Areas.*

Hazardous area protection is determined in accordance with Section 6-4 of the *Life Safety Code.* In assessing the charge for hazardous areas only, one charge shall be made. It shall be the most severe charge corresponding to the deficiencies present. A double deficiency can exist only where the hazard is severe and the space is not sprinkler protected. Double protection consists of both a fire-rated enclosure and automatic sprinkler protection of the hazardous area. If both of these are lacking in a severe hazardous location, the double deficiency charge shall be made. If double deficiencies exist both in the zone and outside the zone, the higher charge (–11) for the condition inside the zone shall be made. The charges are not cumulative, regardless of how many hazardous areas are present.

Where the hazard is not severe, the maximum deficiency that can occur is a single deficiency which may be countered by

[1]Ordinary glass lights shall not be considered as making a partition incomplete in locations where both sides of the glass light are fully protected by automatic sprinkler systems.

either a fire-rated enclosure or automatic extinguishing equipment.

A single deficiency situation will also be considered to exist when a severe hazard is either protected by automatic extinguishing systems or by fire-rated enclosure, but not by both.

The term "adjacent zone" as used in the evaluation form means any zone, either on the same floor or on the floor immediately below, that physically abuts the zone being evaluated and is not separated by 2-hour fire-resistance rated construction.

The term "outside zone" as used in the evaluation form means any place within the building other than the fire/smoke zone being measured.

9. *Smoke Control.*

The smoke control definitions are as follows:

(a) *No Control.* There are no smoke barriers (or horizontal exits) on the floor and there is no mechanical smoke control system.

(b) *Smoke Barrier Serves Zone.* A smoke barrier consists of a partition extending across the entire width of the zone equipped with doors that are either self-closing or are closed upon detection by smoke detectors located at the door arches or other release mechanism as described in 5-2.1.8. To be credited as a smoke barrier an existing partition must also conform with the requirements of 13-3.7.2 through 13-3.7.7 of the *Life Safety Code*. New smoke barriers in either new or existing buildings must meet the more stringent requirements of 12-3.7.2 through 12-3.7.8 of the *Life Safety Code*. A horizontal exit will act as a smoke partition and is credited as both a smoke barrier (Item 9) and an emergency movement route (Item 10).

(c) *Mechanically Assisted Systems — by Zone.* Mechanically assisted smoke control on a zone basis must include a smoke barrier, as in (b) above, supported by a mechanism of automatic controlled fans, smoke vent shafts, or a combination thereof to provide a pressure differential that will assist in confining the smoke to the zone of origin. The fans involved may be special smoke control fans or special adjustment of the normal building air movement fans.

10. *Emergency Movement Routes.*

A movement route is any means of egress meeting the requirements for such means in 5-2.2 through 5-2.6 of the *Life Safety Code*. Horizontal exits shall also meet the requirements stated below. Doors exiting directly to the exterior shall also constitute a movement route from the room containing such a door.

(a) *<Two Routes.* The emergency movement means from a zone is classified as less than two routes if there are not two or more movement routes serving it. Movement routes may be outside the physical limits of the zone.

(b) *Multiple Routes.* The emergency movement route is multiple if the zone occupants have the choice of two or more distinctly separated movement routes from the zone.

(c) *Deficient.*

NOTE: The charges for deficient emergency movement routes are in addition to any values assessed in Safety Parameter Item 7, Vertical Openings.

An emergency movement route is deficient if it is of a type described by 12-2.2 or 13-2.2 but (1) the door to a patient room or passage through a smoke barrier is less than 34 in. (86 cm) [44 in. (112 cm) in new buildings] in clear width or if the corridor in the zone between patient rooms and smoke barriers and exits is less than 48 in. (122 cm) [8 ft (244 cm) in new buildings] in clear width. These figures are based on the minimum width for a wheelchair to egress a room and the minimum width for the passage of a wheelchair in one direction and an ambulatory person in the opposite direction. Exit routes shall also be considered deficient if any of the dimensional details are less than that required by the *Life Safety Code* for the egress route involved. However, any route where the doors from rooms or through partitions or walls are less than 32 in. (81 cm) in the clear, where the corridor(s) involved are less than 34 in. (86 cm) wide or where stair access is less than 28 in. (71 cm) in the clear shall not be credited as an egress route. Exit routes shall also be considered deficient in capacity if they are not provided with emergency lighting in accordance with 12-2.8.1 or 13-2.8.1, or if beds for health care use are not easily moveable as defined by 31-4.1.2 or (2) the route does not otherwise conform to the requirements of 5-2.2 through 5-2.8 but the routes have been or are acceptable to the authority having jurisdiction.

(d) *Horizontal Exit.* The presence of a single horizontal exit from the zone being evaluated shall be considered to meet this requirement provided the space on the opposite side of the horizontal exit is capable of handling all of the patients from affected zones. To be credited as a horizontal exit, the existing arrangement must also conform with the requirements of 13-2.2.4 of the *Life Safety Code*. New horizontal exits in new or existing buildings must meet the more stringent requirements of 12-2.2.4 of the *Life Safety Code*.

To receive credit for horizontal exits, the zone credited must conform to the requirements of 5-5.1.2 with the zone served considered a separate portion of the building.

Also to receive credit for horizontal exits, each patient sleeping room in the zone must be within 150 ft (45 m) travel of a horizontal exit or exit to grade.

(e) *Direct Exits.* To be credited with direct exits, each patient use space (except bath rooms, restrooms, and corridors) in the zone shall have a door operable by the room occupant(s) that opens directly to the exterior at grade or onto an exterior balcony with direct access to an exterior exit or a smokeproof enclosure. To be credited, the direct exit must be ramped or otherwise without steps or changes in elevation that would prevent or obstruct the movement of wheelchairs or wheellittered patients through the direct exits to a place of safety and refuge.

11. *Manual Fire Alarm.*

The manual alarm systems for new construction shall be in accordance with the requirements of 12-3.4.1, 12-3.4.2, 12-3.4.3.1, 12-3.4.4, 12-3.4.6 and 12-3.4.7. Existing construction shall be in accordance with 13-3.4.1, 13-3.4.2, 13-3.4.3.1, 13-3.4.4 and 13-3.4.6. Connection to the fire department shall be considered as being met if the fire alarm system is connected directly to the fire department, through an approved central station, or through other means acceptable to the authority having jurisdiction.

12. *Smoke Detection and Alarm.*

A detection system as used here is one based on use of smoke detectors. No recognition is given for thermal detectors. The detection system categories are as follows:

(a) *None.* There are no smoke detectors in the zone or, if present do not meet any of the following categories.

(b) *Corridor Only.* Smoke detectors located in the corridor shall be considered as meeting the requirement if the

detectors are within 15 ft (4.5 m) of each end of the corridor and not more than 30 ft (9.1 m) apart throughout the corridor. All such detectors shall be electrically interconnected with the fire alarm system. If the facility does not have a fire alarm system, no credit shall be given to the detectors unless they include an alarming system that meets the requirements for alarming that would be involved with a manual fire alarm system. This includes audible alarm devices throughout the building.

(c) *Rooms Only.* Smoke detectors shall be considered as meeting this requirement when there is at least one smoke detector in each room occupied or used by patients. In rooms having a dimension in excess of 30 ft (9.1 m), additional detectors shall be provided so that detector spacing does not exceed approximately 30 ft (9.1 m). Detectors are not required in restrooms or closets. Detectors intended for operation of door closing mechanisms that are located on the patient's side of the door or in the door opening are considered as meeting this requirement for rooms of 500 sq ft (46.5 sq m) or less.

(d) *Corridor and Habitable Spaces.* Detection systems installed throughout the corridors of the zone involved and in the habitable spaces (patient rooms, nurses stations, and other areas basically used for human occupancy) shall be considered as meeting the requirements for a corridor and habitable spaces detection system. Closets, toilet rooms, and other auxiliary spaces as well as ceiling voids, interstitials and other building space not used by humans as a normal part of their regular occupancy are not required to have detectors.

(e) *Total Spaces in Zone.* Total space provision of detectors includes detector coverage of all spaces except noncombustible building voids which contain no combustible materials. The total space credit is to be given if the zone measured meets this criteria, regardless of the presence or lack of detectors in other portions of the building.

13. *Automatic Sprinklers.*

In evaluating sprinkler protection within the zone, the protection or lack of protection of hazardous areas is considered separately and covered under Safety Parameter Item 8. For all other areas in the zone, sprinklers shall be graded on the following basis:

(a) *None.* No credit is applied if there are no sprinklers or if sprinklers, though present, are not sufficient to qualify for one of the other categories listed herein.

(b) *Corridor and Habitable Space*[2]. This credit is based on standard sprinkler spacings in the areas covered and is conditional on the classification of construction type as covered in Safety Parameter Item 1, Construction, as follows:

(1) Item 1, Construction, is based on a "protected" or "fire-resistive" type of construction.[3] This credit is based on a system that effectively provides coverage for all corridor and habitable space in the zone, plus the establishment of water distribution patterns or other protection in a manner to prevent advance of fire from non-sprinklered spaces into the sprinklered spaces. In buildings of protected or fire-resistive construction, the credit is to be applied to any zone where the above conditions are met whether or not areas outside the zone are similarly protected.

(2) Item 1, Construction, is based on an "unprotected" type of construction.[3] In any unprotected type of construction the credit for corridor and habitable space protection is to be given only if, in addition to the conditions described in (1) above, sprinkler protection is also provided in all spaces in the building (including attic or loft spaces) with construction elements that are not sheathed enclosed, or otherwise protected with fire resisting materials such as gypsum board, plaster, or masonry block.

(c) *Entire Building.* Total space automatic sprinkler protection is to be credited only if the entire structure is protected by automatic sprinklers in accordance with Section 7-7 of the *Life Safety Code.*

Wherever sprinkler protection is involved in an area having an unprotected vertical opening, the sprinkler protection around that vertical opening must conform with Chapter 6 of the *Life Safety Code.* This protection is required to allow the credit for sprinkler protection but shall in no way reduce any charge under Safety Parameter Item 7 resulting from an unprotected vertical opening.

In Table C-5 of the Fire Safety Evaluation Form (Individual Safety Evaluations), the value for sprinkler protection credited to the people movement safety (S_3) category is divided by 2. This produces a safety value only one-half the value credited in other categories.

Each sprinkler system shall be provided with supervision. Each sprinkler system shall be electrically interconnected with the fire alarm system and the main sprinkler control valve shall be electrically supervised so that at least a local alarm shall sound in a constantly attended location when the valve is closed.

[2]Habitable space includes patient rooms, nurses stations, and other areas basically used for human occupancy. Habitable space does not include closets, bath rooms, toilets, elevators, and similar spaces.

[3]"Protected" or "fire-resistive" types of construction include Types I; Ii (222) or (111); III (211); and V (111). "Unprotected" types of construction include Types II (000); III (000); and V (000).

FIRE/SMOKE ZONE* EVALUATION WORK SHEET FOR HEALTH CARE FACILITIES
(1985 *Life Safety Code*)

FACILITY_____BUILDING_____

ZONE(S) EVALUATED _____

EVALUATOR _____DATE_____

Complete this work sheet for each zone. Where conditions are the same in several zones, one work sheet can be used for those zones.

*FIRE/SMOKE ZONE is a space separated from all other spaces by floors, horizontal exits, or smoke barriers.

Step 1: Determine Occupancy Risk Parameter Factors — Use Table C-1.

A. For each Risk Parameter in Table C-1, select and circle the appropriate risk factor value. Choose only one for each of the five Risk Parameters.

TABLE C-1. OCCUPANCY RISK PARAMETER FACTORS

RISK PARAMETERS — RISK FACTOR VALUES

1. PATIENT MOBILITY (M)

MOBILITY STATUS	MOBILE	LIMITED MOBILITY	NOT MOBILE	NOT MOVABLE
RISK FACTOR	1.0	1.6	3.2	4.5

2. PATIENT DENSITY (D)

PATIENT	1-5	6-10	11-30	>30
RISK FACTOR	1.0	1.2	1.5	2.0

3. ZONE LOCATION (L)

FLOOR	1ST	2ND OR 3RD	4TH TO 6TH	7TH AND ABOVE	BASE-MENTS
RISK FACTOR	1.1	1.2	1.4	1.6	1.6

4. RATIO OF PATIENTS TO ATTENDANTS (T)

PATIENTS ATTENDANT	1-2 / 1	3-5 / 1	6-10 / 1	>10 / 1	ONE OR† MORE / NONE
RISK FACTOR	1.0	1.1	1.2	1.5	4.0

5. PATIENT AVERAGE AGE (A)

AGE	UNDER 65 YEARS AND OVER 1 YEAR	65 YEARS & OVER 1 YEAR & YOUNGER
RISK FACTOR	1.0	1.2

†RISK FACTOR OF 4.0 IS CHARGED TO ANY ZONE THAT HOUSES PATIENTS WITHOUT ANY STAFF IN IMMEDIATE ATTENDANCE

(Dated 1/85, 1985 *Life Safety Code*)

Step 2: Compute Occupancy Risk Factor (F) — Use Table C-2.

A. Transfer the circled risk factor values from Table C-1 to the corresponding blocks in Table C-2.

B. Compute F by multiplying the risk factor values as indicated in Table C-2.

TABLE C-2. OCCUPANCY RISK FACTOR CALCULATION

	M		D		L		T		A		F
OCCUPANCY RISK		X		X		X		X		=	

(Dated 1/85, 1985 *Life Safety Code*)

Step 3: Compute Adjusted Building Status (R) — Use Table C-3A or C-3B.

A. If building is classified as "New" use Table C-3A. If building is classified as "Existing" use Table C-3B.

B. Transfer the value of F from Table C-2 to Table C-3A or Table C-3B as appropriate. Calculate R.

C. Transfer R to the block labeled R in Table C-7.

TABLE C-3A. (NEW BUILDINGS)

	F		R
1.0 X		=	

TABLE C-3B. (EXISTING BUILDINGS)

	F		R
0.6 X		=	

(Dated 1/85, 1985 *Life Safety Code*)

Step 4: Determine Safety Parameter Values — Use Table C-4.

A. Select and circle the safety value for each safety parameter in Table C-4 that best describes the conditions in the zone. Choose only one value for each of the 13 parameters. If two or more appear to apply, choose the one with the lowest point value.

TABLE C-4. SAFETY PARAMETERS VALUES

PARAMETERS	PARAMETERS VALUES						
1. CONSTRUCTION	COMBUSTIBLE TYPES III, IV AND V				NON-COMBUSTIBLE TYPES I AND II		
FLOOR OF ZONE	000 (U)	111	200 (U)	211 + 2HH	000 (U)	111	222, 332, 443
FIRST	−2	0	−2	0	0	2	2
SECOND	−7	−2	−4	−2	−2	2	4
THIRD	−9	−7	−9	−7	−7	2	4
4TH & ABOVE	−13	−7	−13	−7	−9	−7	4

2. INTERIOR FINISH (Corridors & Exits)	CLASS C	CLASS B	CLASS A		
	−5	0	3		
3. INTERIOR FINISH (Rooms)	CLASS C	CLASS B	CLASS A		
	−3	1	3		
4. CORRIDOR PARTITIONS/WALLS	NONE OR INCOMPLETE	<1/3 HR.	≥1/3<1.0 HR.	≥1.0 HR.	
	−10 (0)[a]	0	1 (0)[a]	2 (0)[a]	
5. DOORS TO CORRIDOR	NO DOOR	<20 MIN. FPR	≥20 MIN. FPR	≥20 MIN. FPR & AUTO CLOS.	
	−10	0	1 (0)[d]	2 (0)[d]	

6. ZONE DIMENSIONS	DEAD END			NO DEAD ENDS >30' & ZONE LENGTH IS:		
	> 100'	50'–100'	30'–50'	>150'	100'–150'	<100'
	−6 (0)[b]	−4 (0)[b]	−2 (0)[b]	− 2	0	1
7. VERTICAL OPENINGS	OPEN 4 OR MORE FLOORS	OPEN 2 OR 3 FLOORS	ENCLOSED WITH INDICATED FIRE RESIST.			
			<1 HR.	≥1 HR.<2 HR.	≥2 HR.	
	−14	−10	0	2 (0)[e]	3 (0)[e]	
8. HAZARDOUS AREAS	DOUBLE DEFICIENCY		SINGLE DEFICIENCY		NO DEFICIENCIES	
	IN ZONE	OUTSIDE ZONE	IN ZONE	IN ADJACENT ZONE		
	−11	−5	−6	−2	0	
9. SMOKE CONTROL	NO CONTROL	SMOKE BARRIER SERVES ZONE	MECH. ASSISTED SYSTEMS BY ZONE			
	−5 (0)[c]	0	3			
10. EMERGENCY MOVEMENT ROUTES	<2 ROUTES	MULTIPLE ROUTES				
		DEFICIENT	W/O HORIZONTAL EXIT(S)	HORIZONTAL EXIT(S)	DIRECT EXIT(S)	
	−8	−2	0	1	5	
11. MANUAL FIRE ALARM	NO MANUAL FIRE ALARM		MANUAL FIRE ALARM			
			W/O F.D. CONN.	W/F.D. CONN.		
	−4		1	2		
12. SMOKE DETECTION & ALARM	NONE	CORRIDOR ONLY	ROOMS ONLY	CORRIDOR & HABIT. SPACE	TOTAL SPACE IN ZONE	
	0	2	3	4	5	
13. AUTOMATIC SPRINKLERS	NONE	CORRIDOR & HABIT. SPACE	ENTIRE BUILDING			
	0	8	10			

NOTE: [a]Use (0) when item 5 is −10.
[b]Use (0) when item 10 is −8.
[c]Use (0) on floor with less than 31 patients (existing buildings only).
[d]Use (0) when item 4 is −10.
[e]Use (0) when item 1 is based on first floor zone or on an unprotected type of construction (columns marked "U").

Conversion: ft × 3048 = m

(Dated 1/85, 1985 *Life Safety Code*)

Step 5: Compute Individual Safety Evaluations — Use Table C-5.

A. Transfer each of the 13 circled safety parameter values from Table C-4 to every unshaded block in the line with the corresponding safety parameter in Table C-5. For Safety Parameter Item 13 (Sprinklers) the value entered in the People Movement Safety column is recorded in Table C-5 as one-half the corresponding value circled in Table C-4.

B. Add the four columns, keeping in mind that any negative numbers deduct.

C. Transfer the resulting total values for S_1, S_2, S_3, S_G to the blocks labeled S_1, S_2, S_3, S_G in Table C-7.

TABLE C-5. INDIVIDUAL SAFETY EVALUATIONS

SAFETY PARAMETERS	CONTAINMENT SAFETY (S_1)	EXTINGUISHMENT SAFETY (S_2)	PEOPLE MOVEMENT SAFETY (S_3)	GENERAL SAFETY (S_G)
1. CONSTRUCTION				
2. INTERIOR FINISH (Corridors & Exits)				
3. INTERIOR FINISH (Rooms)				
4. CORRIDOR PARTITIONS/WALLS				
5. DOORS TO CORRIDOR				
6. ZONE DIMENSIONS				
7. VERTICAL OPENINGS				
8. HAZARDOUS AREAS				
9. SMOKE CONTROL				
10. EMERGENCY MOVEMENT ROUTES				
11. MANUAL FIRE ALARM				
12. SMOKE DETECTION & ALARM				
13. AUTOMATIC SPRINKLERS			÷ 2 =	
TOTAL VALUE	S_1 =	S_2 =	S_3 =	S_G =

(Dated 1/85, 1985 *Life Safety Code*)

Step 6: Determine Mandatory Safety Requirement Values — Use Table C-6.

A. Using the classification of the building (i.e., New or Existing) and the floor where the zone is located, circle the appropriate value in each of the three columns in Table C-6.

B. Transfer the three circled values from Table C-6 to the blocks marked S_a, S_b, and S_c in Table C-7.

TABLE C-6. MANDATORY SAFETY REQUIREMENTS

	CONTAINMENT S_a		EXTINGUISHMENT S_b		PEOPLE MOVEMENT S_c	
ZONE LOCATION	New	Exist	New	Exist	New	Exist.
FIRST FLOOR	9	5	6 (4)*	4	6 (4)*	1
ABOVE OR BELOW FIRST FLOOR	14	9	8 (6)*	6	9 (7)*	3
OVER 75 FT (23 M) IN HEIGHT	14	9	18 (16)*	6	10 (8)*	3

*Use value in parentheses ( ) for hospitals.

(Dated 1/85, 1985 *Life Safety Code*)

Step 7: Evaluation Fire Safety Equivalency — Use Table C-7.

A. Perform the indicated subtractions in Table C-7. Enter the differences in the appropriate answer blocks.

B. For each row check "Yes" if the value in the answer block is zero or greater. Check "No" if the value in the answer block is a negative number.

TABLE C-7. ZONE SAFETY EQUIVALENCY EVALUATION					YES	NO
CONTAINMENT SAFETY (S_1)	less	MANDATORY CONTAINMENT (S_a)	≥ 0	S_1 S_a C □ − □ = □		
EXTINGUISHMENT SAFETY (S_2)	less	MANDATORY EXTINGUISHMENT (S_b)	≥ 0	S_2 S_b E □ − □ = □		
PEOPLE MOVEMENT SAFETY (S_3)	less	MANDATORY PEOPLE MOVEMENT (S_c)	≥ 0	S_3 S_c P □ − □ = □		
GENERAL SAFETY (S_G)	less	OCCUPANCY RISK (R)	≥ 0	S_G R G □ − □ = □		

(Dated 1/85, 1985 *Life Safety Code*)

CONCLUSIONS:

1. ☐ All of the checks in Table 7 are in the "Yes" column. The level of fire safety is at least equivalent to that prescribed by the *Life Safety Code*®. *

2. ☐ One or more of the checks in Table 7 are in the "No" column. The level of fire safety is not shown by this system to be equivalent to that prescribed by the *Life Safety Code*. *

*The equivalency covered by this work sheet includes the majority of considerations covered by the *Life Safety Code*. There are a few considerations that are not evaluated by this method. These must be separately considered. These additional considerations are covered in the "Facility Firesafety Requirements Work Sheet." One copy of this separate work sheet is to be completed for each facility.

TABLE C-8. FACILITY FIRESAFETY REQUIREMENTS WORK SHEET

COMPLETE ONE COPY OF THIS WORK SHEET FOR EACH FACILITY
FOR EACH CONSIDERATION SELECT AND MARK THE APPROPRIATE COLUMN

		MET	NOT MET	NOT APP.
A.	Building utilities conform to the requirements of Section 7-1.			
B.	In new facilities only, life support systems, alarms, emergency communication systems and illumination of generator set locations are powered as prescribed by 12-5.1.2 and 12-5.1.3.			
C.	Heating and air conditioning systems conform with the air conditioning, heating, and ventilating systems requirements within Section 7-2.			
D.	Fuel burning space heaters and portable electrical space heaters are not used.			
E.	There are no flue fed incinerators.			
F.	An evacuation plan is provided and fire drills conducted in accordance with 31-1.5, 31-4.1, and 31-4.2.			
G.	Smoking regulations have been adopted and implemented in accordance with 31-4.4.			
H.	Combustible draperies, furnishings and decorations are prohibited in accordance with 31-4.5.			
I.	Fire extinguishers are provided in accordance with the requirements of 12-3.5.5 and 13-3.5.5.			
J.	Exit signs are provided in accordance with the requirements of 12-2.10.1 and 13-2.10.1.			
K.	In new facilities without mechanically assisted smoke control systems, each patient room has an openable outside window or door as described by 12-3.8.1.			

(Dated 1/85, 1985 *Life Safety Code*)

This system has been prepared by the Fire Safety Engineering Division, Center for Fire Research, NBS, as part of the HEW/NBS Life Safety project.

APPENDIX D
ALTERNATIVE CALCULATIONS FOR STAIRS WIDTH

This Appendix is not a part of the requirements of this NFPA Code, but is included for information purposes only.

Numbers in parentheses following text refer to references given at the end of this Appendix.

NOTE: It is assumed that those using this Appendix are generally familiar with performance-based egress design concepts including an understanding of what is meant by key terms such as speed, density and flow — the three main physical characteristics of crowd movement. To minimize misunderstanding, definitions are given for such terms where they are shown in upper case letters below.

1. **Background to the Calculation Method.**

This Appendix describes a system of calculations to determine what stair width is needed to provide a given flow capacity and flow time. (FLOW is the number of persons passing a point in a unit of time. FLOW TIME is the total time required for a crowd to move past a point in the egress system. CAPACITY is the number of persons a movement facility can serve in a certain time; it should not be confused with DEMAND, the number of persons actually attempting to use the facility.) The calculations take into account:

(a) Actual number of persons in the egressing crowd,

(b) Varying abilities of different types of crowd,

(c) Direction of crowd movement (ascent or descent),

(d) Stair width as determined by handrail centerlines, wall boundaries or (in the case of aisle stairs) the ends of seating rows, and

(e) Other details of stair design and construction including handrail reachability, dimensions of risers and treads, and flight length.

The calculations relating stair width and egress performance are based on what is called the "effective width model for evacuation flow." The following is a short introduction to this model and the formulas derived from the model.

The EFFECTIVE WIDTH MODEL relates the usable width of a stair and its flow capacity where there is a large simultaneous demand on an egress sytem by a crowd of people.

The model describes the following observed phenomena: There is an EDGE EFFECT at the sides of a movement facility, i.e., most people in a crowd tend to keep a small clearance from side boundaries of a movement facility. Furthermore, because of lateral BODY SWAY (the natural side-to-side swaying of people to maintain balance when walking slowly) people in a crowd do not walk in regimented lanes, shoulder-to-shoulder fashion, but in a freer, staggered arrangement that makes efficient use of the available space and permits each person to see several steps ahead.

Mean egress flow, plotted against stair width, is a linear function not a step function as assumed in the traditional model based on lanes of movement and units of exit width. In other words, the regression line for flow as a function of stair width [varying by small increments between 34 and 88 in.) (86 cm and 229 cm)] does not support any lane model whether it is based on 22, 24, 30 or 34 in. (55.9 cm, 61 cm, 76 cm or 86 cm). [The examination of this relation included data in often referenced reports by the U.S. National Bureau of Standards in 1935(1) and the London Transport Board in 1958(2).] The mean flow is directly proportional to the EFFECTIVE STAIR WIDTH which is:

The nominal or usually credited stair width minus approximately 12 in. (30 cm), or

Where there are two handrails, the handrail centerline spacing minus 7 in. (17.8 cm).

(Figure D-1 shows the relationship between these widths.)

This linearity and proportionality is not surprising in view of the crowd behavior patterns noted above.

MEAN FLOW (the total egress population divided by the time required for the crowd to move past one point in the egress system) is influenced in a nonlinear fashion by the total population per effective width of stair. For example, increasing from 120 to 150 the number of persons in a crowd using a stair will result in a slightly higher flow and a flow time increased by less than the ratio 150/120.

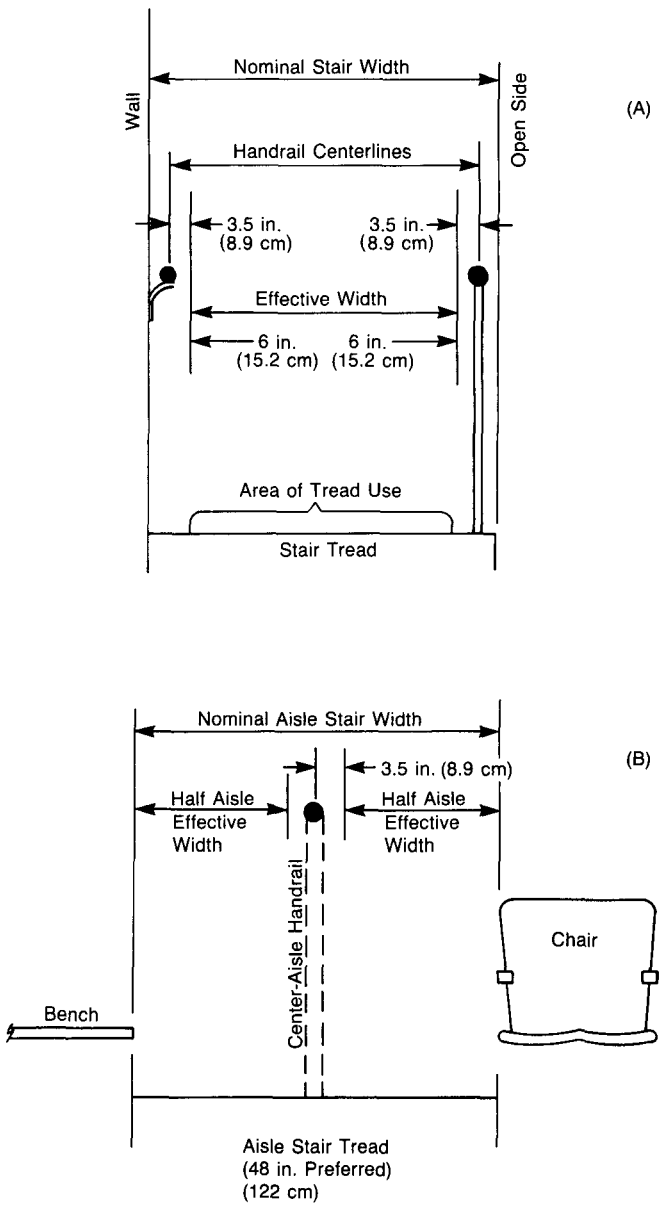

Figure D-1 Measurement of Effective Width of Stairs in Relation to Walls, Handrails and Seating.

The effective width model and the study methods that lead to its development were described in detail in two chapters of the book *Fires and Human Behaviour* (3)(4). An applications-oriented paper, with several equations and a useful predictive graph (given below in updated form as Figure D-2), was prepared for a 1980 Workshop at the U.S. National Bureau of Standards (5). A brief description of the model's use appeared in a special safety-oriented issue of *Journal of Architectural Education* (6).

2. **Flow Time Performance Criteria.**

One use of the model is to make explicit what the traditionally accepted egress performance actually is for various Code rules relating evacuation population capacity and stair width based on 22 in. (55.9 cm) "units of exit width." Common Code rules such as 60 or 75 persons per unit of exit stair width lead to flow times of approximately 3 to 4 minutes. Such flow times may be used in equivalency-based calculations to relate stair width and egress capacity.

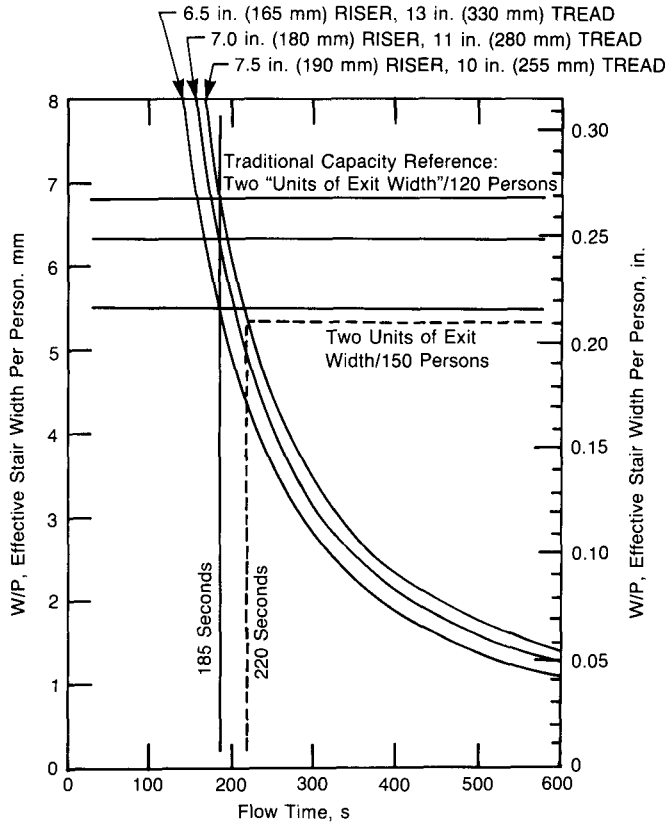

Figure D-2 Relation Between Effective Stair Width per Person and Flow Time.

Thus, one measure of traditionally accepted egress performance is a flow time of approximately 3 to 4 minutes for occupants of a space to evacuate via stairs. In other words, assuming some QUEUING (where demand exceeds capacity) throughout the flow time at the entry to the egress stair, approximately 3 to 4 minutes will be required to clear the space of its able-bodied occupants once mass movement is initiated. Here it should be noted that, in emergency conditions, a significant amount of PRE-FLOW TIME is often required for some people to perceive the need for a mass evacuation, to make all present aware of the need to evacuate, and to initiate crowd flow. Such pre-flow components of total evacuation time — perhaps comparable in size to flow time — are not dealt with in this Appendix. It is assumed that these other components will be realistically considered when the method outlined here forms part of any proposal relating hazard development time and evacuation time.

By specifying the width and riser-tread geometry of stairs it is possible to state flow time performance criteria more precisely. In this Appendix the stair used for reference purposes, to suggest a flow time performance criterion, is two units or 44 in. (112 cm) wide and it is used by 150 persons. The reference stair has risers 7 in. (17.8 cm) high and 11 in. (27.9 cm) treads, measured horizontally between nosings. One hundred fifty persons can move past a point on such a stair in a flow time of 3.45 minutes or 207 seconds.

Table D-1, located at the end of this Appendix, provides a convenient guide to population capacities for various stair widths and riser-tread geometries. It is developed from the calculation method described below and is based on the 3.45 minute flow time related to these population and riser-tread reference conditions.

Other stair rules, more common in previous editions of the *Life Safety Code*, lead to slightly different flow times. On stairs having 7.5-in. (19.1-cm) risers and 10-in. (25.4-cm) treads the movement of 120 persons on a 44-in. (112-cm) stair (60 persons per unit) results in a flow time of approximately 185 seconds. There is a flow time of approximately 220 seconds when such a stair is used by 150 persons. These reference capacities and flow times are marked on Figure D-2 and the influence of riser-tread dimensions is treated in more detail in Section 4, General Equation and Adjustments.

3. **Calculation Method Using Graph.**

Figure D-2 is a graph generally relating effective stair width per person, several common riser-tread geometries and flow time. Using the graph, one can predict egress performance, in terms of flow time, from information about egress population and the width and step-geometry of the egress stair. Alternatively, one can begin with a required flow time and choose appropriate stair geometries for a certain egress population. One can also calculate mean evacuation flow over the course of an evacuation simply by dividing the actual number of persons using a stair by the flow time read from the graph. [The mean flows found in this way fall within the range of Fruin's levels of service: C, D, E, and F (7).]

The graph in Figure D-2 is labeled in terms of effective stair width per person. Figure D-1 shows diagramatically the relationship between effective width and measurements that are generally shown on design drawings or measured in the field. EFFECTIVE STAIR WIDTH begins:

6 in. (15.2 cm) from a wall, possibly more or less depending on surface roughness and cleanliness.

3.5 in. (8.9 cm) from the centerline of a handrail (the centerline of the handrail is the preferred reference point for determining effective width).

At the farthest projection of seats into an aisle stair.

In Figure D-2 separate curves are provided for three common riser-tread geometries. Data for the upper curve on the graph come from studies of stairs with an average pitch of 37 degrees, e.g., with 7.5-in. (19.1-cm) risers and 10-in. (25.4-cm) treads — the former standard in the *Life Safety Code*. The middle curve, suggesting approximately 7.5 percent improved efficiency, applies to stairs with 7-in. (17.8-cm) risers

and 11-in. (27.9-cm) treads — the recently adopted minimum standard in the *Life Safety Code* and the ICBO *Uniform Building Code*. Even better efficiency — a further 12.5 percent better than the middle curve — is suggested by the third, lowest curve which applies to moderate-pitch stairs with 6.5-in. (16.5-cm) risers and 13-in. (33.0-cm) treads.

Improved egress efficiency is one benefit that partly compensates for the additional building area required by less steep stairs. Enhanced safety for people moving on the stairs is the other major benefit.

To provide the traditionally accepted flow time of 185 seconds, resulting when 120 persons use a stair with a nominal width of 44 in. (112 cm) and an effective width of 32 in. (81 cm), the effective width in inches per person is 0.268, 0.248 and 0.217 (.68 cm, .63 cm and .55 cm), respectively, for the curves for former standard, current standard and preferred standard riser-tread geometries. Note also that this range of egress width provision, as a function of step geometry, falls within the range currently permitted in the *Life Safety Code*. The rule, permitting 75 persons per unit of stair width, specifically 150 persons using a two-unit stair, is equivalent to a minimum of 0.213 in. (.54 cm) of effective stair width per person. A traditionally dimensioned, three-unit stair used by 225 persons provides 0.24 in. (.61 cm) of effective stair width for each person.

4. General Equation and Adjustments.

The central curve in Figure D-1 has the following equation:

$$\text{Equation 1:} \quad \frac{W}{P} = 317\ T^{-1.37}$$

where W is the effective stair width in inches,
P is the actual number of persons evacuating, and
T is the flow time in seconds (not to exceed 600).

Because of reduced comfort and efficiency (in descent) with stairs having higher risers and smaller treads, there is a case to be made for adjusting W/P (given by Equation 1 or read from the central curve of Figure D-2) up or down according to riser and tread sizes. The following is suggested as a guide in cases where a stair is used in the descending direction by a crowd.

Subtract 1 percent from W/P for every 0.2 in. (.5 cm) that the tread exceeds 11 in. (27.9 cm), up to a maximum of 10 percent.

Add 1 percent to W/P for every 0.2 in. (.5 cm) that the tread is less than 11 in. (27.9 cm).

Subtract 1 percent from W/P for every 0.2 in. (.5 cm) that the riser is less than 7 in. (17.8 cm) up to a maximum of 5 percent.

Add 1 percent to W/P for every 0.2 in. (.5 cm) that the riser exceeds 7 in. (17.8 cm).

Several other adjustments to W/P or to flow time performance may be appropriate to credit properly the performance differences that may be due to other factors of stair design, construction and use factors. For example:

Add 10 percent to W/P for stairs where crowds must ascend.

Assume that performance in the descending direction will be reduced by 15 percent for aisles stairs or other stairs that have one or more of the following: unusually long flights, distracting views, tread nosings that are difficult to see, and large nonuniformities in riser and tread dimensions.

Assume that any portion of a stair that is more than 31 in. (79 cm) away from a graspable handrail perfoms at least 15 percent more poorly than otherwise calculated when used by a descending crowd. (*See Table D-1 and Part 6, Commentary Regarding Minimum and Maximum Stair Widths, for further information on this.*)

Assume that a stair used by a crowd containing a significant number of persons who are elderly, very young, or unfamiliar with the stair and its surroundings will perform up to 20 percent more poorly than otherwise calculated.

Finally, it should be noted that there are other use factors that may have significant positive or negative effects on evacuation performance. For example, a stair that may be several inches too narrow (relative to some requirement) may perform acceptably well in evacuations if there is sufficient preparedness and familiarity on the part of management and users. Conversely, an otherwise acceptable stair may have its advantages negated by factors such as normal prohibition of use because of security concerns. Generally, the design and approval of egress facilities requires good judgment which goes beyond strict adherence to quantitative formulas whether they be unit width-based or effective width-based.

5. Example Calculations.

A single flight stair descending 84 in. (213 cm) is to be used by 310 persons in a transit station with a flow time of 220 seconds. What widths of stair will provide this performance with riser-tread geometry based on (a) 7-in. (17.8-cm) risers and 11-in. (27.9-cm) treads, and (b) 6-in. (15.2-cm) risers and 13-in. (33.0-cm) treads? What are the areas required for each flight? (The 220-second flow time in this example calculation is slightly longer than the 207 seconds described above in Part 2, Flow Time Performance Criteria, and this accounts for some of the difference noted below in relation to *Code* requirements based on 75 persons per unit width.)

(a) Using the middle curve of Figure D-2, the flow time of 220 seconds is linked with W/P = 0.19 in. (.48 cm) of effective stair width per person. Multiplying by 310, obtain an effective width of 59 in. (150 cm). Adding 7 in. (17.8 cm) gives a handrail centerline spacing of 66 in. (168 cm) (which could result in a reduction of about 2 percent in flow performance because of this slightly excessive spacing when used by a descending crowd). Adding 12 in. (30.5 cm), obtain a nominal, wall-to-wall width of 71 in. (180 cm). The area required for this flight of stairs with 12 risers [at 7 in. (17.8 cm) for a total rise of 84 in. (213 cm)] is 12 × 11 × 71 = 9372 sq in. or 65 sq ft (6.0 sq m).

(b) Using the middle curve of Figure D-2, the flow time of 220 seconds is linked with W/P = 0.19 in. (.48 cm) of effective stair width per person. This is adjusted for the better riser (minus 5 percent), and the better tread (minus 10 percent) for a net adjustment of minus 15 percent. The adjusted W/P is therefore 0.162 in. (.41 cm) of effective stair width per person. Multiplying by 310, the population served by the stair, we obtain an effective width of 50 in. (127 cm). Adding 7 in. (17.8 cm) gives a handrail centerline spacing of 57 in. (145 cm) or adding 12 in. (30.5 cm) gives the nominal, wall-to-wall width of 62 in. (157 cm). The area required for the flight of stairs with 14 risers [at 6 in. (15.2 cm) for a total rise of 84 in. (213 cm)] is 14 × 13 × 62 = 11,284 sq in. or 78.4 sq ft (7.3 sq m).

This example illustrates that stair (b), built with a better riser and tread geometry for descent, results in a width that is 13 percent narrower than stair (a), built to *Code* minimum; however, stair (b) requires 20 percent more building area.

Their relative performance, in terms of flow time, is expected to be within 2 percent, with stair (b) having the slight advantage. The benefits to stair (b) may well lie in the area of comfort and safety particularly for descent and these considerations may warrant spending the additional amount.

The example also can be extended to illustrate the virtues of the effective width model over the traditional unit width model. The *Life Safety Code*, Chapter 8, requires 4.5 units of exit stair width for 310 persons. (The addition of 10 persons over 300 — a difference of 3 percent — necessitates adding 12.5 percent more width when the relatively crude unit-width model is used.) This translates to a nominal width of 4 × 22 in. (55.9 cm) plus 12 in. (30.5 cm) or 100 in. (254 cm) — at least 40 percent greater width and area than stair (a) which would presumably have the same minimum-standard riser-tread geometry. Even more striking is the difference when the traditional 60 persons per unit width rule is used. This results in a requirement for a stair 5.5 units wide or 122 in. (310 cm) — 72 percent larger than stair (a).

The foregoing example illustrates the use of the calculation method for cases using a flow time performance criterion different from that assumed in the *Code*. Relating population and stair width, in cases using a *Code*-equivalent flow time of 207 seconds or 3.45 minutes, is greatly simplified through the use of a table such as Table D-1. Populations and stair widths can be read directly. Furthermore, stair width limits are established in relation to handrail height, a topic discussed further in the next section.

Table Showing Population Capacities Based on the Effective-Width Model for Various Stair Widths and Dimensions for Risers and Treads

			Population (P) that Can Be Evacuated in a Flow Time of 3.45 min. — Equivalent to the Estimated Flow Time Where There are 150 Persons on a 44-in. Wide Stair (@ 75 Persons per Unit of Exit Width) with 7.0-in. Risers and 11.0-in. Treads.			
Nominal Width inches	**Handrail Centers inches**	**Effective Width (W) inches**	**Population for Stair with Riser-Tread:**			
			7.5-10.0	**7.0-11.0**	**6.5-12.0**	**6.5-13.0**
			P=0.229W	**P=0.213W**	**P=0.197W**	**P=0.186W**
36	31	24	105	113	122	129
37	32	25	109	117	127	134
38	33	26	114	122	132	140
39	34	27	118	127	137	145
40	35	28	122	132	142	150
41	36	29	127	136	147	156
42	37	30	131	141	152	161
43	38	31	135	146	157	166
44	39	32	140	150	162	172
45	40	33	144	155	168	177
46	41	34	149	160	173	183
47	42	35	153	164	178	188
48	43	36	157	169	183	193
49	44	37	162	174	188	199
50	45	38	166	178	193	204
51	46	39	170	183	198	209
52	47	40	175	188	203	215
53	48	41	179	193	208	220
54	49	42	184	197	213	225
55	50	43	188	202	218	231
56	51	44	192	207	223	236
57	52	45	197	211	229	242
58	53	46	201	216	234	247
59	54	47	205	221	239	252
60	55	48	210	225	244	258
61	56	49	214	230	249	263
62	57	50	218	235	354	268
This is maximum recommended width where handrails are 34 inches high.						
63	58	51	223	240	259	274
64	59	52	227	244	264	279
65	60	53	232	249	269	285
66	61	54	236	254	274	290
67	62	55	240	258	279	295
This is maximum recommended width where handrails are 36 inches high.						
Assume that the effective width and capacity of any additional width is reduced by 15 percent to 35 percent, depending on handrail height. Suggested values are shown for handrails 30-36 inches in height.						
78	73	62-64	271-281	291-302	315-327	333-345
88	83	69-73	300-318	322-342	349-370	369-391

Conversion: 1 in. = 2.54 cm

Table D-1 Population Capacities Based on the Effective Width Model for Various Stair Widths and Dimensions for Risers and Treads.

6. **Commentary Regarding Minimum and Maximum Stair Widths.**

Fruin, Templer and Pauls have all addressed the subject of appropriate minimum stair width for situations where stairs are heavily used by crowds for unidirectional or bidirectional flows (5)(6)(7)(8). Based on his belief that a 30-in. (76-cm) "lane" should be provided, particularly in situations where bidirectional flow occurs on a stair, Fruin recommends a nominal stair width of 60 in. (152 cm). Fruin also emphasizes the importance of providing sufficient space for people carrying briefcases, luggage, etc. Templer discusses a minimum width between stair walls of 38.5 in. (98 cm) for comfortable movement of a 99th percentile adult and 29 in. (74 cm) as the bare minimum for a 95th percentile adult. He recommends that, as a minimum to permit people to walk side by side or pass with comfort, a stair should be based on two lanes 28 in. (71 cm) wide or at least 56 in. (142 cm) between walls. Pauls recommends a minimum handrail-to-handrail centerline spacing of 50 in. (127 cm) which results in a 55-in. (140-cm) minimum clearance between walls.

Less research has been done on maximum spacing between handrails. Here the reasoning is based on safety, specifically handrail reachability on one or both sides of a person on a stair. Pauls recommends that the maximum distance between the center of a person's position on a stair and the centerline of a handrail should not exceed 24 in. (61 cm). This horizontal distance is a function of handrail height and is based on handrails approximately 36 in. (91 cm) above tread nosings. [For handrails as low as 30 in. (76 cm), the 24-in. (61-cm) distance should be drastically reduced.] Adding 14 in. (35.6 cm) for the space used for the clearance from center body position to a wall, this results in a maximum wall-to-handrail width of 38 in. (97 cm) where only one handrail is provided 36 in. (91 cm) above tread nosings. For situations where two handrails are provided and the stair is to be used extensively by crowds, the maximum handrail-to-handrail spacing is 62 in. (157 cm). This assumes that handrails are at least 36 in. (91 cm) above tread nosings. The recommended maximum spacing would be reduced to approximately 57 in. (145 cm) for handrails 34 in. (86 cm) above tread nosings.

A special case has been made by Sweden's leading stair researcher, Kvarnstrom, for stairs used by elderly persons and others who need maximum support, with both hands on a handrail, when using a stair (9). A 27-in. (69-cm) spacing is recommended. As well as being recommended for institutions such a spacing might be warranted in public settings where a special lane might be provided on a wide stair for such persons who will form an increasing portion of the total population using buildings.

References.

(1) *Design and Construction of Building Exits.* Miscellaneous Publication 151, National Bureau of Standards, Washington, DC, 1935.

(2) *Second Report of the Operational Research Team on the Capacity of Footways.* London Transport Board, London, 1958.

(3) J. Pauls & B. Jones. "Building evacuation: Research methods and case studies." In Canter (ed) *Fires and Human Behaviour.* Wiley & Sons Ltd., pp. 227-249, 1980.

(4) J. Pauls. "Building evacuation: Research findings and recommendations." In Canter (ed.) *Fires and Human Behaviour.* Wiley & Sons Ltd., pp. 251-275, 1980.

(5) J. Pauls. "Effective-width model for evacuation flow." Proceedings, Workshop on Engineering Applications of Fire Technology, NBS, Washington, DC, April 1980.

(6) J. Pauls. "Building design for egress." *Journal of Architectural Education,* Summer 1980, p. 38-42.

(7) J. Fruin. *Pedestrian Planning and Design.* Metropolitan Association of Urban Designers and Environmental Planners, New York, 1971. (This book is now out of print. An expanded text is in preparation by Dr. Fruin, with the title *Designing for Pedestrians.*)

(8) J. Templer. *Stair Shape and Human Movement.* Ph.D. Dissertation, Columbia University, New York, 1974. (A text book, *Stairs and Ramps,* based on the dissertation, is in preparation by Dr. Templer.)

(9) L. Kvarnstrom. Trappor. T3:1977, Statens rad for byggnadsforskning, Stockholm, 1977 (in Swedish).

APPENDIX E FIRESAFETY EVALUATION SYSTEM FOR DETENTION AND CORRECTIONAL OCCUPANCIES

This Appendix is not a part of the requirements of this NFPA Code, but is included for information purposes only. The term "shall" in this Appendix is used to indicate that if one chooses to use the Appendix, then, within the system described, the item is mandatory.

This Appendix describes a system for determining the relative level of safety for new or existing detention and correctional occupancies in Use Conditions II, III, IV, or V, as compared to explicit conformance with the applicable requirements of Chapters 1 through 31. This system considers mixes and arrangements of safeguards, most of which are described in detail in Chapters 1 through 31.

Procedure for Determining Equivalency.

Using the "Firesafety Evaluation Worksheet: Detention and Correctional Occupancies" (dated 1/85, 1985 *Life Safety Code*), evaluate the entire facility as defined in Sections 14-1 and 15-1 on a single worksheet. Where different Use Conditions or fire protection features are involved, portions of the facility separated from each other by 2-hour or greater fire resistance rated construction (including any members that bear the load of detention use, egress, or refuge space and with 1½-hour fire protection rated doors in any communication opening) may be evaluated separately.

Maintenance.

Any protection system, requirements, arrangements, or procedures which are not maintained in a dependable operating condition, or are used in such a manner that the intended firesafety function or hazard constraint is impaired, or are not in a sufficient state of readiness should be considered as defective and receive no credit in the evaluation.

Safety Parameters (Table E-1).

General Discussion. The safety parameters are a measure of those building factors that bear upon or contribute to the safety of those persons who may be in the building at the time of a fire. (*See Table E-1.*)

Each of the safety parameters is to be analyzed, and the safety value for each parameter that best describes the condition in the building is to be identified. Only one value for each of the parameters is to be chosen. If two or more appear to apply, the one with the lowest point value governs.

1. *Construction Type.*

Construction types are defined by the fire resistance and combustibility of load-bearing framing members, floor construction, and roof construction in accordance with NFPA 220, *Standard on Types of Building Construction* (*see Appendix B*). The following table is abstracted from NFPA 220.

EVALUATION SYSTEM	NONCOMBUSTIBLE					COMBUSTIBLE				
	FIRE RESISTIVE		PROTECTED		UN-PROT	ORDINARY			WOOD FRAME	
NFPA 220, 1979 EDITION TYPES	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[1]	2	2	2	1	0[1]
Supporting one floor only	4	3	2	1	0[1]	2	2	2	1	0[1]
Supporting a roof only	4	3	1	1	0[1]	2	2	2	1	0[1]
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, bearing walls or other columns	4	3	2	1	0	1	0	H[2]	1	0
Supporting one floor only	3	2	2	1	0	1	0	H[2]	1	0
Supporting a roof only	3	2	1	1	0	1	0	H[2]	1	0
BEAMS, GIRDERS, TRUSSES & ARCHES—										
Supporting more than one floor, bearing walls or columns	4	3	2	1	0	1	0	H[2]	1	0
Supporting one floor only	3	2	2	1	0	1	0	H[2]	1	0
Supporting a roof only	3	2	1	1	0	1	0	H[2]	1	0
FLOOR CONSTRUCTION	3	2	2	1	0	1	0	H[2]	1	0
ROOF CONSTRUCTION	2	1½	1	1	0	1	0	H[2]	1	0
EXTERIOR NONBEARING WALLS	0[1]	0[1]	0[1]	0[1]	0[1]	0[1]	0[1]	0[1]	0[1]	0[1]

▨ Those members listed that are permitted to be of approved combustible material.

[1]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. These items are covered in other parameters as appropriate.

[2]"H": indicates heavy timber members; see NFPA 220 for requirements.

Where the facility includes additions or connected structures of different construction the rating and classification of the structure shall be based on (a) separate buildings if a 2-hour or greater fire-resistance rated separation exists between the portions of the building, and on (b) the lower safety parameter point score involved if such a separation does not exist.

The story used to determine the parameter value is the highest story used for confinement purposes. Story height is based on stories starting with the primary level of exit discharge. When there are stories below the primary level of exit discharge, the maximum value assigned the construction parameter shall be based on a 2-story building or the actual story height, whichever is the lower value.

A multitiered open cell block may be considered as a single story providing that one or more of the following conditions exist:

(a) A smoke control system is provided (*see recommended design criteria in A-15-3.1.3*) to maintain the level of smoke filling, from potential cell fires, at least 5 ft (152 cm) above the floor level of any occupied tier.

(b) A smoke control system as described in (a) above is provided to maintain the level of smoke filling at least 5 ft (152 cm) above the exit level where:

1. The cell block is Occupancy Condition II,

2. The cell block is Occupancy Condition III and all persons housed in the cell block 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 cell.

(c) Complete automatic sprinkler protection is provided.

2. *Hazardous Areas.*

The assignment of charges for hazardous areas is a four-step process.

STEP 1. Identify Hazardous Areas. Hazardous areas are defined in 14-3.2 and 15-3.2.

STEP 2. Determine the Level of Hazard. A hazardous area is classed as severe if it is a padded cell or if it has sufficient fire or explosion potential to defeat the basic integrity of the building framing as defined in Parameter 1.

STEP 3. Determine the Fire Protection Provided. The parameter value for hazardous areas is based on the presence or absence of the fire protection necessary to control or confine the hazard. Two levels of fire protection are considered. The first consists of automatic sprinklers or other appropriate extinguishing system covering the entire hazard. The second is based on fire-resistant enclosures including any bearing members in the space, partitions separating the hazardous area from all other spaces, and doors to the space sufficient to exceed the potential of the fire load involved. Any hazardous space that has either protection system is classified as having single protection. Any hazardous space that is both fully enclosed in a capable fire-resistant enclosure and sprinklered is classified as having both (i.e., double level protection). On this basis, any fuel load that has such potential as to overwhelm the available structural capability of both its own enclosure and the basic structure could as a maximum have single protection.

STEP 4. Determine the Degree of Deficiency and Assign Parameter Values. The parameter value is finally determined on the basis of the degree of deficiencies that the hazardous area has in terms of the level of protection needed.

Figure E-1 provides a matrix-type table to assist in determining the degree of deficiency to be assessed.

In some situations more than one hazardous area with the same or differing levels of deficiency will exist. The charge is based on the single most serious charge for a hazardous area found.

3. *Fire Alarm.*

(a) *No Alarm.* There is no fire alarm system, or the system is incomplete and does not meet the requirements necessary for a higher scored category.

(b) *W/O F.D. Notification.* There is a manual fire alarm system or smoke detection system conforming with the appropriate requirements of 14-3.4 or 15-3.4 except that the requirements of 14-3.4.3.2 or 15-3.3.2 covering automatic transmission of the alarm to the fire department are not met.

(c) *W/F.D. Notification.* There is a manual fire alarm or smoke detection system conforming with the appropriate requirements of 14-3.4 or 15-3.4.

1. *W/O Manual Alarm.* There is no manual alarm system but a smoke detection alarm system or sprinkler system recognized under Parameter 4 or 5 of this system is provided and is arranged to transmit an alarm automatically to the fire department.

	NO PROTECTION	SPRINKLER PROTECTION	1-HOUR FIRE RESISTANCE RATED ENCLOSURE	SPRINKLERED & 1-HOUR FIRE RESISTANCE RATED ENCLOSURE
HAZARDOUS AREA	SINGLE DEFICIENCY	NO DEFICIENCIES		
SEVERELY HAZARDOUS AREA	DOUBLE DEFICIENCY	SINGLE DEFICIENCY	NO DEFICIENCIES[A] DOUBLE DEFICIENCY[B]	NO DEFICIENCIES[A] SINGLE DEFICIENCY[B]

A: If fire resistance and structural strength exceed maximum potential of hazard.

B: If fire resistance or structural strength is not sufficient to withstand potential of hazard.

Figure E-1 Hazardous Areas — Degree of Deficiency.

2. *W/Manual Alarm.* There is a manual alarm system and it is arranged to transmit an alarm automatically to the fire department.

4. *Smoke Detection.*

A detection system as used here is one based on use of smoke detectors meeting the installation requirements of 14-3.4.4 and 15-3.4.4 and NFPA 72E, *Standard on Automatic Fire Detectors* (*see Appendix B*), with the extent of coverage as defined below. No credit is given for thermal detectors in habitable spaces. The detection system categories are as follows:

(a) *None.* There are no smoke detectors or, if present, they do not meet the requirements needed for a higher score.

(b) *Corridors, Common Spaces and Sleeping Rooms for More than Four Persons.* Smoke detection requirements of such spaces located within the residential housing area are covered by smoke detector installations in accordance with NFPA 72E.

(c) *All Sleeping Rooms.* Smoke detectors shall be considered as meeting this requirement when there is at least one smoke detector in each sleeping room occupied or used by prisoners. In rooms having a dimension in excess of 30 ft (9.1 m), additional detectors are provided so that detector spacing does not exceed approximately 30 ft (9.1 m). Detectors are not required in restrooms or closets.

(d) *Full Coverage.* Meets the requirements of (b) and (c).

(e) *Total Building.* Total building detector credit requires conformance with the requirements of NFPA 72E for total coverage.

5. *Automatic Sprinklers.*

In evaluating sprinkler protection, the protection or lack of protection of hazardous areas is considered separately and covered under Safety Parameter 2 except that total building protection must include hazardous areas. Also the presence or lack of fire department notification is considered separately under Safety Parameter 3. In all other aspects any sprinkler installations shall conform to 14-3.5 and 15-3.5 and be graded on the following basis:

(a) *None.* No credit is given if there are no sprinklers or if sprinklers, though present, are not sufficient to qualify for one of the other categories listed herein.

(b) *Residential Housing Areas.* The credit for sprinkler protection of residential housing areas is given for arrangements where sprinklers are located throughout the areas such that all space within such area (including cells or sleeping rooms) is covered by the protection spray pattern of sprinkler heads.

(c) *Entire Building.* The building is totally sprinkler protected in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems* (*see Appendix B*), for light hazard occupancy (or higher hazard occupancy for any spaces classified as higher hazard by NFPA 13).

6 and 7. *Interior Finish.*

Classification of interior finish is in accordance with 14-3.3 and 15-3.3 as appropriate.

No consideration is included in the Safety Parameter Value for any finish with a flame spread rating $>$ 200 or for any material not rationally measured by NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials* (*see Appendix B*). Materials not rationally measured include: foam plastics, asphalt-impregnated paper and/or materials capable of inducing extreme rates of fire growth and rapid flashover. In any case where these materials are involved, the resultant risk is considered to classify any such finish area as a hazardous area to be evaluated under Safety Parameter 2, Hazardous Areas.

NOTE: ¼-in. (.6-cm) plywood is considered as having a flame spread rating of 200 or less.

8. *Cell/Sleeping Room Enclosure.*

The charges for cell or sleeping room enclosure are divided between those for cells or sleeping rooms that face directly onto a corridor and those where there is an intervening common space (i.e., day room, group activity space or other space between the sleeping room and the corridor access).

(a) *Open.* Open includes any cell or sleeping room enclosure that includes opening in excess of 120 sq in. (11.1 sq m). In Use Condition V the closure shall be considered "open" if there are any openings exceeding the minimum necessary for door swing and latch unless (1) the affected cells meet the smoke control requirements for mechanically assisted in Safety Parameter 13 or (2) there is a closure for such openings closeable from inside the cell.

(b) *Smoketight $<$ 1 Hour.* An enclosure qualifies in this category if the walls are complete from slab to slab or to a continuous smoketight ceiling and doors are complete but some wall aspect (wall, ceiling, etc.) is less than 1-hour fire resistive, or the door is not capable of resisting fire for at least 20 minutes.

(c) *One-Hour Fire Resistance or Greater ($\geq$ 1-Hour Fire Resistance).* An enclosure qualifies in this category if it meets all of the requirements for (b) above, and all wall aspects have at least 1-hour fire resistance and the door is capable of resisting fire for at least 20 minutes.

9. *Separation of Residential Housing Areas* from Other Areas.*

The charges for separation of residential housing areas are based on the quality of the common walls and separating partitions and door between residential housing areas and the rest of the building. The charge is based on the residential housing area that has the lowest quality separation. Where a building contains more than one residential housing area, the separation of residential housing areas from each other is also to be considered equally to the separation of a residential housing area from some other type of space. In buildings entirely composed of a single residential housing area the separation is considered equivalent to fire resistant if there is at least 30 ft (9.1 m) separation from other structures, smoketight if there is a separation less than 30 ft (9.1 m).

Classification of internal separations is based on the following:

(a) *Incomplete.* Any separation that does not meet the criteria for (b) or (c) below.

(b) *Smoketight $<$ 1 Hour.* An enclosure qualifies in this category if the walls are complete from slab to slab or to a

*Residential housing area: includes sleeping areas and any contiguous day room, group activity space or other common space.

continuous smoketight ceiling and doors are complete but some wall aspect (wall, ceiling, etc.) is less than 1-hour fire resistance rated, or the door is not capable of resisting fire for at least 20 minutes.

(c) *One-Hour Fire Resistance Rated or Greater (≥ 1-Hour Fire Resistance).* An enclosure qualifies in this category if it meets all of the requirements for (b) above, and all wall aspects have at least 1-hour fire resistance rating and the door is capable of resisting fire for at least 20 minutes.

10. *Exit System.*

Exit routes are the paths of travel from the residential housing area to outside of any of the types and arrangements described in Chapter 5. The exit route starts at the corridor interface with the cell or common space as indicated by Safety Parameter 8.

(a) *Multiple Routes.* Multiple routes exist when the occupants of any residential housing area either have from the residential housing area or through access in a corridor adjacent to the residential housing area a choice of two separate exit routes to the outside of the types listed in 14-2.2 and 15-2.2.

(b) *Deficient.* An exit route is deficient if it is usable with reasonable safety but fails to meet any of the applicable criteria in Chapter 5.

(c) *Direct Exits.* To be credited with direct exits, each cell or other sleeping room must have a door that opens to the exterior at grade, or to an unenclosed exterior balcony with direct access to an exterior exit or smokeproof tower. The locking of such door must be no more restrictive than that required for the least restrictive exit or smoke barrier door for the use condition involved. In large rooms the maximum travel distance from any occupiable location to a direct exit must not exceed 50 ft (15 m). Where the separation of the individual sleeping rooms from other spaces and from each other is smoketight, the credit for direct exits is applicable even if there are no other exit routes from the involved sleeping rooms.

No exit shall be considered in this parameter unless the locking arrangement conforms with the criteria for the Use Condition being applied to the facility.

11. *Exit Access.*

Exit access is the travel distance from any point in a room to an exit (or smoke barrier in an existing building). In addition, any exit arrangement that does not conform with 14-2.6.1 for new buildings or 15-2.6.1 for existing construction shall receive a parameter value no higher than the score for egress travel, that is, > 150 (> 45 m) and ≤ 225 ft (≤ 69 m).

The penalty for dead-end access shall be charged when any corridor affords access in only one direction to a required exit from that corridor. The calculation of the distance to determine the level of charge is the measurement from the centerline of the doorway exiting to the corridor to the doorway of the exit from the corridor or building, whichever is shorter. Exit travel is the distance from the door to the corridor to the point where the building is exited or a stairwell is entered, whichever is less. Where the distance to the stairwell is the shorter distance, that distance shall be based on the distance to the door enclosing the stairwell if the stairwell is enclosed or to the top tread if the stairwell is open.

12. *Vertical Openings.*

These values apply to vertical openings and penetrations including exit stairways, ramps and any other vertical exits, pipeshafts, ventilation shafts, duct penetrations and laundry and incinerator chutes. The charge for vertical openings shall be based on the presence or lack of enclosure and the fire resistance of enclosure, if present.

A vertical opening or penetration shall be classified as *"open or incomplete enclosure"* if it is: (a) unenclosed; (b) enclosed but does not have doors; (c) enclosed but has openings other than doorways; (d) enclosed with cloth, paper, or similar materials without any sustained firestopping capabilities.

If a shaft other than a credited exit route (i.e., credited as one of the multiple routes required in Safety Parameter 10 or in determining travel distance in Safety Parameter 11) is enclosed on all floors but one and this results in an unprotected opening between that shaft, and one and only one floor, the parameter value assigned to that shaft shall be "0." If a required egress route is contained in that shaft, the parameter value shall be "-2."

If vertical firestopping is incomplete, the vertical opening so created shall be evaluated using the above criteria.

Two communicating floor levels are permitted without enclosure protection between levels provided they meet the requirements of 14-3.1.2 or 15-3.1.2, as appropriate.

Vertical opening charges do not apply to open multitiered cell blocks classified as single-story buildings in accordance with the permission set forth in Safety Parameter 1, Construction.

Smoketight. A complete enclosure is provided and is capable of resisting the passage of smoke but does not meet the fire resistance requirements of 6-2.2.3.3.

Fire Resistant. A smoketight enclosure that also meets the fire resistance requirements of 6-2.2.3.3.

13. *Smoke Control.*

Smoke control definitions are as follows:

(a) *No Control.* There are no smoke barriers (or horizontal exits) on the floor and accessible to those confined.

(b) *Smoke Compartment — Passive.* The credit for smoke barriers is to be credited to any facility meeting the requirements of 14-3.7 or 15-3.7, as appropriate.

(c) *Smoke Compartment — Mechanically Assisted.* Mechanically assisted smoke control on a compartment basis must include a smoke barrier (or a horizontal exit) supported by a mechanism of automatic control fans, smoke vent shafts, or a combination thereof to provide a pressure differential that will assist in confining smoke to the compartment of origin. Fans involved may be special smoke control fans or special adjustments of the normal building air movement fans.

(d) *Heat and Smoke Vent System.* A heat and smoke vent system is a system meeting the design criteria set forth in A-15-3.1.3, A Recommended Method of Calculating Expected Level of Smoke in a Smoke Removal Equipped Cell Block, or other satisfactory means so designed as to maintain the level of smoke above head height in the residential housing area. The additional credit for this system shall be given if the operation of the exhaust system is initiated automatically by smoke detection available in the zone.

FIRESAFETY EVALUATION WORKSHEET

DETENTION AND CORRECTIONAL OCCUPANCIES

BUILDING IDENTIFICATION_____

EVALUATOR_____DATE_____

Complete one worksheet for each building evaluated.

STEP 1. Complete the building identification, evaluator and date entries above.

STEP 2. Determine the most restrictive Use Condition in the facility.

Check the appropriate Use Condition below.

_____ Use Condition II—Zoned Egress
_____ Use Condition III—Zoned Impeded Egress
_____ Use Condition IV—Impeded Egress
_____ Use Condition V—Contained

NOTE: If Use Conditions III or IV are involved, the combination of staff location, remote release locks, and/or fire detection must be sufficient to ensure the prompt release required by the Use Condition checked.

STEP 3. Determine Safety Parameter Values — Use Table E-1.

A. Select and circle the safety value for each safety parameter that best describes the conditions in the zone. Choose only one value for each of the 13 safety parameters. If two or more appear to apply, choose the one with the lowest point value.

Table E-1 Safety Parameter Values

1. CONSTRUCTION TYPE	V (000)	V (111)	IV (2HH)	III (200)	III (211)	II (000)	II (111)	II (222) OR I (ANY)
1ST FLR	−2	0	0	−2	0	0	2	2
2ND FLR	−2	0	0	−2	0	−2	2	2
3RD FLR	−8 (−2) A	−2 (0) A	−2 (0) A	−8 (−2) A	0	−5 (−2) A	2	2
≥4TH FLR	−10 (−2) A	−4 (0) A	−4 (0) A	−10 (−2) A	−2 (0) A	−8 (−2) A	0	2

2. HAZARDOUS AREAS	WITHIN RES. HOUSING AREA		OUTSIDE RES. HOUSING AREA		NONE OR NO DEFICIENCIES
	DOUBLE DEFICIENCY	SINGLE DEFICIENCY	DOUBLE DEFICIENCY	SINGLE DEFICIENCY	
	−7	−4	−4 (−7) B	0	0

3. FIRE ALARM	NO ALARM	W/O F.D. NOTIFICATION	W/F.D. NOTIFICATION	
			W/O MAN. ALARM	W/MAN. ALARM
	−1	0	1	2

4. SMOKE DETECTION	NONE	RESIDENTIAL HOUSING AREA			TOTAL BLDG.
		PARTIAL COVERAGE		FULL COVERAGE	
		CORR. + COMM. SPA. + LRG. SLEEPING RMS.	ALL SLEEPING RMS.		
	−4 (−1) A	0	2	4	5

5. AUTOMATIC SPRINKLERS	NONE	RESIDENTIAL HOUSING AREA	ENTIRE BUILDING
	0	8	10

6. INTERIOR FINISH (CORRS.+EGRESS)	CLASS C	CLASS B	CLASS A
	−3	−1	0

7. INTERIOR FINISH (OTHER AREAS)	CLASS C	CLASS B	CLASS A
	−2	−1	0

8. CELL/ROOM ENCLOSURE	CELLS (ROOMS) FACE ON CORRIDOR (EACH CELL IS A SEPARATE RESIDENTIAL HOUSING AREA)	INTERVENING COMMON SPACE WITHIN RESID. HOUSING AREA		
		OPEN	SMOKETIGHT <1 HOUR	≥ 1 HOUR FIRE RESISTANCE RATED
	0	−3 (−5) C (0) D	0 (−2) C	2 (0) C

9. SEPARATION OF RESID. HOUSING AREAS FROM OTHER AREAS	INCOMPLETE	SMOKETIGHT < 1 HOUR	≥ 1 HOUR FIRE RESISTANCE RATED
	−6	2 (4) H	4 (2) B

10. EXIT SYSTEM	<2 ROUTES	MULTIPLE ROUTES		
		DEFICIENT	NO DEFICIENCIES	DIRECT EXIT
	−6	−2	0	3

11. EXIT ACCESS	DEAD ENDS		NO DEAD ENDS >50 FT + TRAVEL IS (I)			
	>100 FT	>50 FT (I)	>225 FT	≤225 FT	>150 FT	≤150 FT
	−2 (0) G	−1 (0) G	−2 (0) G	−1 (0) G		0

12. VERTICAL OPENINGS	OPEN OR INCOMPLETE ENCLOSURES			ENCLOSED (E)	
	THRU ≥4 FLOORS	2-3 FLOORS	1 FLOOR	SMOKETIGHT	FIRE RESISTANT
	−10 (0) F	−7 (0) F	−2 (0) F	0	2

13. SMOKE CONTROL	NO CONTROL	SMOKE COMPARTMENTS		HEAT + SMOKE VENT SYSTEM
		PASSIVE	MECHANICALLY ASSISTED	
	−2	2	3	8

(Dated 1/85, 1985 *Life Safety Code*)

A—Use ( ) if Parameter 5 is 10.
B—Use ( ) if Parameter 1 is based on II (000), III (200) or V (000) construction and Parameter 5 is 0.
C—Use ( ) for Use Condition V new construction when Parameter 5 is 0.
D—Use ( ):
—For Use Condition Level II.
—For Use Condition III if intervening space in ≤50 ft
—For Use Condition IV if Parameter 5 is ≥8 and intervening space is ≤50 ft
For existing buildings if either:
—Parameter 13 = 8, or
—Parameter 5 is ≥8 and Parameter 4 is ≥0
E—Use 0 in 1-story buildings.
F—Use ( ) if Parameter 13 is 8.
G—Use ( ) if Parameter 10 is −6.
H—Use ( ) for Use Conditions II, III, and IV new construction if cells are facing access corridor.
I—Use 20 ft (6.1 m) for Use Condition V.
Conversion: 1 ft = .3048 m

STEP 4. Compute Individual Safety Evaluations — Use Table E-2.

A. Transfer each of the 13 circled safety parameter values on Table E-1 to every unshaded block in the line with the corresponding parameter title in Table E-2. Where the block is indicated (÷ 2) enter only ½ the value shown in Table E-1.

B. Add the four columns, keeping in mind that any negative numbers are deducted.

C. Transfer the resulting values for S_1, S_2, S_3, and S_4 to the blanks marked S_1, S_2, S_3, and S_4 in Table E-4.

Table E-2 Individual Safety Evaluations

Safety Parameter	Fire Control Provided (S_1)	Egress Provided (S_2)	Refuge Provided (S_3)	General Firesafety Provided (S_4)
1. Construction				
2. Hazardous Areas		÷ 2		
3. Fire Alarm	÷ 2			
4. Smoke Detection	÷ 2			
5. Automatic Sprinklers		÷2	÷2	
6. Interior Finish (Egress, etc.)				
7. Interior Finish (Other Areas)	÷ 2			
8. Cell/Room Enclosure				
9. Separation of Residential Housing Areas from Other Areas		÷ 2		
10. Exit System			÷ 2	
11. Exit Access				
12. Vertical Openings	÷ 2			
13. Smoke Control				
Total	S_1 =	S_2 =	S_3 =	S_4 =

(Dated 1/85, 1985 *Life Safety Code*)

STEP 5. Determine Mandatory Safety Requirements — Use Table E-3.

A. Select the proper row of Table E-3. Circle the appropriate values.

B. Transfer the circled values from Table E-3 to the blocks marked S_a, S_b, S_c, and S_d in Table E-4.

Table E-3A Mandatory Safety Requirements Partially Sprinklered and Nonsprinklered Buildings

USE CONDITION	HEIGHT	FIRE CONTROL S_a		EGRESS S_b		REFUGE S_c		GENERAL S_d	
		NEW	EXIST	NEW	EXIST	NEW	EXIST	NEW	EXIST
II + III	1 STORY	4	0	6	4	6	2	6	1
	2 STORY	5	3	8	6	8	6	8	5
	3 STORY	7	5	8	6	10	8	10	7
IV	1 STORY	6	2	10	8	6	2	10	5
	2 STORY	7	5	12	10	8	6	12	9
	3 STORY	9	7	12	10	10	8	14	11
V	1 STORY	8	6	10	9	8	6	12	9
	2 STORY	9	9	12	11	10	10	14	13
	3 STORY	9	9	12	11	10	10	14	13

(Dated 1/85, 1985 *Life Safety Code*)

Table E-3B Mandatory Safety Requirements Totally Sprinklered Buildings

USE CONDITION	HEIGHT	FIRE CONTROL S_a		EGRESS S_b		REFUGE S_c		GENERAL S_d	
		NEW	EXIST	NEW	EXIST	NEW	EXIST	NEW	EXIST
II, III, IV	1+2 STORY	2	2	4	2	−1	−1	2	0
	>=3 STORY	7	2	6	2	5	−1	8	0
V	1+2 STORY	10	10	8	6	7	7	10	8
	>=3 STORY	15	10	10	6	13	7	16	8

(Dated 1/85, 1985 *Life Safety Code*)

STEP 6. Firesafety Equivalency Evaluation.

A. Perform the indicated subtractions in Table E-4. Enter the differences in the appropriate answer blocks.

B. For each row check "Yes" if the value in the answer block is zero or greater. Check "No" if the value in the answer block is a negative number.

Table E-4 Firesafety Equivalency Evaluation

Table E-4 Firesafety Equivalency Evaluation			Yes	No
Control Provided (S_1) Less	Required Control (S_a) > = 0	$S_1 - S_a = C$ ☐ − ☐ = ☐		
Egress Provided (S_2) Less	Required Egress (S_b) > = 0	$S_2 - S_b = E$ ☐ − ☐ = ☐		
Refuge Provided (S_3) Less	Required Refuge (S_c) > = 0	$S_3 - S_c = R$ ☐ − ☐ = ☐		
General Firesafety (S_4) Less	Required Gen. Firesafety (S_d) > = 0	$S_4 - S_d = G$ ☐ − ☐ = ☐		

(Dated 1/85, 1985 *Life Safety Code*)

Conclusions:

1. ( ) All of the checks in Table E-4 are in the "Yes" column. The level of firesafety is at least equivalent to that prescribed by the *Life Safety Code*.

2. ( ) One or more of the checks in Table E-4 are in the "No" column. The level of firesafety is not shown by this system to be equivalent to that prescribed by the *Life Safety Code*.

The equivalency covered by this worksheet includes the majority of considerations covered by the *Life Safety Code*. There are a few considerations that are not evaluated by this method. They must be considered separately. These additional considerations are covered in Step 7.

STEP 7. Additional Considerations.

(The following items are required by the *Life Safety Code* as firesafety features but are beyond the scope of equivalency evaluation of the Firesafety Evaluation System. They must be accounted for separately.)

		Yes	No
1.	Utilities and building services conform to the requirement of Section 14-5 of the *Life Safety Code*.		
2.	24-hour staffing is provided as required by 31-5.1 of the *Life Safety Code*.		
3.	Furnishing and decorations combustibility is limited in accordance with 31-5.4 of the *Life Safety Code*.		
4.	Portable fire extinguishers are provided at least at staff locations.		
5.	Standpipes are provided in all buildings over 75 ft (23 m) tall and nonsprinklered buildings over 3 stories in height.		
6.	If Use Conditions III or IV are involved, is the combination of staff location, remote release locks, and fire detection sufficient to ensure the prompt release required by those Use Conditions?		

(Dated 1/85, 1985 *Life Safety Code*)

APPENDIX F
A PROCEDURE FOR DETERMINING EVACUATION CAPABILITY

This Appendix is not a part of the requirements of this NFPA Code, but is included for information purposes only. The term "shall" in this Appendix is used to indicate that if one chooses to use the Appendix, then, within the system described, the item is mandatory.

Chapter 21 defines three levels of evacuation capabilities of the residents as a group (with staff assistance): (a) prompt; (b) slow; and (c) impractical. Chapter 21 also prescribes the firesafety protection requirements for each level of evacuation capability. This Appendix describes a method for determining evacuation capability.

Separate subsystems are provided for:

(a) Rating the evacuation capabilities of individual residents. (Step 1)

(b) Computing the relative level of evacuation difficulty faced by the occupants of a given facility. This includes rating the Promptness of Response for the staff, introducing an adjustment for number of floors, and calculating an Evacuation Difficulty Score.

Subsection 21-1.3 defines three evacuation capability levels in terms of evacuation difficulty scores.

Procedure for Determining Evacuation Capability.

STEP 1. For each resident, complete one copy of Worksheet F-1, Worksheet for Rating Residents. Follow the instructions on the Worksheet. Use the Instruction Manual for Rating Residents for further guidance and for definitions of terms.

STEP 2. For each facility complete one copy of Worksheet F-2, Worksheet for Calculating Evacuation Difficulty Score (E-Score). Follow the instructions on the Worksheet. Use the Instruction Manual for Calculating Evacuation Difficulty Score for further guidance and for definitions of terms.

STEP 3. Determine evacuation difficulty using the E-Score from Step 2 and the criteria of 21-1.3.

Instruction Manual for Rating Residents (Worksheet F-1)

Base ratings on commonly observed examples of poor performance.

The Evacuation Difficulty Score has been designed to minimize speculation about how residents might perform in an actual fire emergency by basing ratings on already observed performance. Instead of speculating, raters who are not familiar enough with a resident to confidently provide ratings should consult with someone who has observed the resident on a daily basis.

Due to the stress of a real fire emergency, some residents are not likely to perform as well as they are capable of doing. Therefore, ratings based on commonly observed examples of poor performance provide the best readily available indication of behavior that may be degraded due to the unusually stressful conditions of an actual fire. All persons naturally tend to be less capable on some days, and the ratings should be based on examples of resident performance on a typically "bad" day. Ratings should not be based on rare instances of poor performance.

Risk Factors (refer to Worksheet F-1, side 2).

I. Risk of Resistance.

This means that there is a reasonable possibility that, during an emergency evacuation, the resident may resist leaving the group home.

Unless there is specific evidence that resistance may occur, the resident should be rated as "minimal risk."

Specific evidence of resistance means that staff have been required to use some physical force in the past. However, an episode of resistance should not be counted if it resulted from a situation that was different enough from a real fire emergency so that the incident probably does not predict behavior in a real fire emergency. For example, an incident when a resident refused to leave his bedroom to visit his parents would probably not predict behavior in a real fire emergency and would not be counted as specific evidence. Resistance may be active (for example, the resident may have struck a staff member or attempted to run away) or passive (for example, the resident may have "gone limp" or hid from staff members). Mere complaining or arguing is not considered resistance.

(a) *Minimal Risk.* This means that there is no specific evidence to suggest that the resident may resist an evacuation.

(b) *Risk of Mild Resistance.* This means that there is specific evidence that the resident may mildly resist leaving the group residence.

Examples of specific evidence that a resident should be rated in this category are as follows:

1. The resident has mildly resisted instructions from staff. Further, the resistance was brief or easily overcome by one staff member, and occurred in a situation similar enough to a fire emergency to predict that the behavior could recur during a fire emergency, or

2. The resident has hidden from the staff in a situation similiar enough to a fire emergency to predict that the behavior could recur during a real fire emergency. However, once found, the resident offered no further resistance.

(c) *Risk of Strong Resistance.* This means that the resident may offer resistance that requires the full attention of one or more staff members.

Examples of specific evidence that suggest that a resident should be rated in this category are as follows:

1. The resident has struggled vigorously in a situation similar enough to a fire emergency to predict that the behavior could recur during a fire emergency, or

2. The resident has totally refused to cooperate in a situation that is similar enough to a fire emergency to predict that the behavior could recur during a real fire emergency, or

3. The resident has hidden in a situation that is similar enough to a fire emergency to predict that the behavior could recur during a real fire emergency. Moreover, once found, the resident continued to offer resistance.

II. Impaired Mobility.

This means that the resident is physically limited in his or her ability to leave the home. The rating should reflect the present physical environment in the building where the resident lives and should be based on the resident lying awake on his/her bed. The resident is rated according to how easily he or she can leave, given the presence of physical barriers that hinder movement (such as stairs), the resident's ability to get

out of bed or chairs he or she normally uses, and so forth. The resident should be given credit for being able to use devices that aid movement (for example, wheelchairs, walkers, crutches, and leg braces). However, the rater may give credit for such devices only if they are always available for an emergency evacuation.

The resident should be rated on his or her ability to use the most accessible route out of the home. For example, a resident who is "self-starting" when he uses the back door, but who "needs limited assistance" to get out the front door would be rated as "self-starting."

The rater should test the resident when he/she is under the influence of any routine medication that slows the resident's movement.

When the resident needs physical assistance to make a timely evacuation, the amount of assistance required is based on the categories defined below. Physical assistance means that the staff member must use some strength to assist the resident. Guiding or directing the resident by giving gentle pushes or leading by the hand is not considered physical assistance.

(a) *Self-Starting.* This means that the resident is physically able to start and complete an evacuation without physical assistance.

(b) *Slow.* This means that the resident prepares him- or herself to leave and travels to the exit (or an area of refuge) at a speed significantly slower than normal. Specifically, the resident is rated "slow" if he/she cannot prepare him- or herself to leave, and then travel from his/her bedroom to the exit (or area of refuge) within a period of 90 seconds.

(c) *Needs Limited Assistance.* This means that the resident may require some initial or brief intermittent assistance, but can accomplish most of the evacuation without assistance. (The total time required to physically assist the resident should not exceed the amount of time typically required in the examples listed below.)

The following are a few examples of capabilities that fall within this category:

The resident would be physically able to start and complete an evacuation, except that:

1. The resident needs help to get into a wheelchair, or

2. The resident needs help to descend stairs in the building, or

3. The resident needs help to get out of bed, or

4. The resident needs help to open a door.

(d) *Needs Full Assistance or Very Slow.* This means that the resident needs "full assistance" or is "very slow" as defined in this section.

Needs full assistance. The resident needs full assistance if either (1) the resident may require physical assistance from a staff member during most of the resident's evacuation or (2) the total time required to physically assist the resident is equal to or greater than the time required in the examples below.

The following are a few examples of capabilities that fall within this category:

1. The resident may need to be carried from the building.

2. The resident needs help to get into a wheelchair and must be wheeled out of the building.

3. The resident needs help to get into leg braces and needs help to descend steps.

Very slow. The resident is rated very slow if the time necessary for the resident to prepare him- or herself to leave, and then travel from his/her bedroom to the exit, is so long that the staff cannot permit the resident to evacuate unassisted. Specifically, the resident is rated very slow if he/she cannot prepare him- or herself to leave, and then travel to the exit (or area of refuge), in 150 seconds.

III. Impaired Consciousness.

This means that the resident could experience a partial or total loss of consciousness in a fire emergency.

Unless there is specific evidence that loss of consciousness may occur during a fire emergency, the resident should be rated as "no significant risk."

Specific evidence means that the resident has experienced some temporary impairment of consciousness of short duration (seconds or minutes) six or more times during the three months preceding the rating of the resident. Regardless of frequency, if there is specific evidence that loss of consciousness may be caused by the stress of a fire emergency, the resident should be rated as having impaired consciousness. An episode of partial loss of consciousness should be counted only if the impairment was severe enough to significantly interfere with the resident's ability to protect him- or herself. Do not count episodes where the loss of consciousness was the result of a temporary medical problem (e.g., a severe infection).

(a) *No Significant Risk.* This means that the resident is not subject to loss of consciousness or that the resident has had fewer than six episodes of consciousness loss (partial and total) during the three months preceding the ratings.

(b) *Partially Impaired.* This means that the resident has had at least six episodes of consciousness loss in the last three months, and that the most severe of these episodes was only a partial loss of consciousness; that is, the resident would still be able to participate somewhat in his or her own evacuation.

Examples of specific evidence that a resident should be rated in this category include loss of consciousness resulting from mild (partial or petit mal) seizures, dizzy spells, intoxication, or any other partially incapacitating impairment of consciousness.

(c) *Totally Impaired.* This means that the resident has had at least six episodes of consciousness loss in the last three months, and that the most severe of these episodes was a total or severely incapacitating loss of consciousness; that is, the resident would require the full assistance of at least one staff member to get out of the building.

Examples of specific evidence that a resident should be rated in this category include losses of consciousness resulting from severe (generalized or grand mal) seizures, fainting spells, intoxication, or other total or severely incapacitating loss of consciousness.

IV. Need for Extra Help.

This means that there is specific evidence that more than one staff member may be needed to evacuate the resident.

Specific evidence means that two or more persons have been previously needed to assist the resident, and that the resident could require assistance from two persons in a real fire emergency.

When rating the resident on whether there is a need for additional assistance, the rater should disregard the presence of staff members who appear unusually strong or weak. (For example, a staff member who is exceptionally strong or an unusually small staff member would be disregarded when rating the resident on Need for Extra Help.)

(a) *Needs Only One Staff.* This means that there is no specific evidence that the resident might need help from two or more persons in a fire emergency.

(b) *Needs Limited Assistance from Two Staff.* This means that the resident might require some initial or brief intermittent assistance from two persons, but will otherwise need help from no more than one person.

The following are a few examples of capabilities that fall within this category.

The resident would require help from no more than one person except that:

1. The resident needs two persons to get into a wheelchair.

2. The resident needs two persons to descend stairs that are present in the building.

(c) *Needs Full Assistance from Two Staff.* This means that the resident might require assistance from two persons during most of the resident's evacuation from the building.

The following are a few examples of capabilities that fall within this category:

1. The resident may need to be carried from the building and this would require two persons, or

2. The resident would need two persons to get into a wheelchair and to get the wheelchair down a flight of stairs, or

3. The resident may vigorously resist an evacuation and two persons would be required to get the resident out of the building.

V. Response to Instructions (Staff-Directed Evacuation).

This means the resident's ability to receive, comprehend and follow through with simple instructions.

Residents often do not respond equally well to all staff members. Therefore, residents should be rated on their responses to staff members whose directions they are least likely to follow.

(a) *Follows Instructions.* This means that the resident can usually be depended on to receive, comprehend, remember and follow simple instructions.

(b) *Requires Supervision.* This means that the resident is generally capable of following instructions, but is not dependable. Therefore, the resident may need to be guided, reminded, reassured or otherwise accompanied during his or her evacuation, but will not require the exclusive attention of a staff member. (For example, a staff member can simultaneously lead two or more residents who fit this classification.)

This category includes elderly persons who sometimes show early signs of senile dementia or cerebral arteriosclerosis (for example, confusion, disorientation, frequent "misplacement" of possessions) and young children who cannot be depended on to follow through with instructions.

Some examples of resident capabilities that fall within this category are as follows.

The resident is generally capable of following instructions except that:

1. The resident is deaf or hearing impaired and sometimes misinterprets communications from staff using sign language, or

2. The resident sometimes forgets instructions after a brief period of time, or

3. The resident is sometimes distracted or confused and fails to follow through with instructions, or

4. The resident is sometimes groggy and may fail to listen carefully or follow through with instructions, or

5. The resident is sometimes uncooperative without apparent good reason, or

6. The resident is elderly and sometimes becomes "lost" in a familiar place, or

7. The resident is a young child who may become frightened and not follow through with instructions.

(c) *Requires Considerable Attention or May Not Respond.* This means that the resident may fail to receive, understand or follow through with instructions; that is, the resident may not respond to instructions or general guidance. Therefore, the resident may require most of the attention of a staff member during his or her evacuation.

Some examples of resident capabilities that fall within this category are as follows:

1. The resident sometimes does not understand simple instructions, or

2. The resident may not respond to instructions from a particular staff member, or

3. The resident is sometimes emotionally upset and is therefore unwilling to follow instructions, or

4. The resident is deaf or hearing impaired and the staff cannot communicate reliably with the resident, or

5. The resident is very forgetful, easily confused or easily distracted.

VI. Waking Response to Alarm.

This means that the fire alarm may fail to awaken the resident.

Residents should be rated as "response probable" unless any of the following four conditions is true:

(a) The building does not have an alarm system meeting the requirements of Chapter 21 or the alarm is not very loud where the resident sleeps (doors should be closed and barriers kept in place when testing the loudness of the fire alarm), or

(b) Medication taken by the resident before retiring differs in type or amount (increased) from the medication taken for waking hours, or

(c) The resident has a readily apparent hearing impairment or the resident removes his or her hearing aid when sleeping, or

(d) There is some specific evidence that the resident may be an exceptionally sound sleeper. (Examples of specific evidence are: the resident did not wake up during some particularly loud clamor or racket and staff members have had to vigorously shake the resident to awaken him or her.)

When any of the four conditions is true, then the resident should be rated as "response not probable" unless the resident's

ability to wake up has been demonstrated. The demonstration of the resident's ability to wake up to the fire alarm should be conducted after the first half-hour of sleep and during the first three hours of sleep. Also, the resident's ability to wake up to the alarm should be demonstrated on two different nights under usual conditions (for example, without hearing aid, under usual medications, and so forth). Also, the resident should be alert enough to follow simple instructions within one minute of waking up. In order to avoid awakening other residents, a device that makes a sound that is similar to but not louder than the fire alarm may be used (for example, an alarm clock can be used instead of a bell alarm).

(a) *Response Probable.* This means that none of the four conditions is true for the resident or, when any of the conditions is true, the resident's ability to wake up has been demonstrated.

(b) *Response not Probable.* This means that one or more of the conditions is true for the resident, and that either the resident has not been tested for his or her ability to wake up to the fire alarm, or the resident failed to demonstrate his or her ability to wake up to the alarm.

VII. Response to Fire Drills (Self-Directed Evacuation).

This relates to the resident's ability to leave the building as demonstrated by the resident's performance during fire drills.

It covers his or her ability to make decisions but does not relate to mobility, which is covered in a separate factor. For example, a resident may need assistance only in transferring from bed to wheelchair but otherwise can promptly initiate and complete an evacuation. Such a resident would get a "yes" for "Initiates and Completes Evacuation Promptly" (0 points) and would be rated "Needs Limited Assistance" on the "Impaired Mobility" factor (6 points).

Components of a Self-Directed Evacuation. There are three basic tasks that a resident must perform reliably and without instructions or supervision in order to receive the most favorable rating on this factor:

(a) *Initiates and Completes Evacuation Promptly.* The resident must have demonstrated a proper response to an alarm or warning of a fire by starting and completing the evacuation without unnecessary delay.

(b) *Chooses and Completes Back-up Strategy.* The resident must have demonstrated the ability to select an alternative means of escape or take other appropriate action if the primary escape route is blocked.

(c) *Stays at Designated Location.* The resident must have demonstrated that he/she will stay at a designated safe location during fire drills. (The whereabouts of already evacuated residents needs to be confirmed to avoid dangerous return trips to look for residents who may have returned to buildings.)

The resident shall be credited with being able to perform a task only when the resident has been specifically trained or instructed in the desired task and has demonstrated the desired reponse in at least three of the last four fire drills for which the skill was tested.

When the skill has not been tested in four fire drills, the resident shall be credited only when the resident has demonstrated the desired response during the last two opportunities to test the skill.

Ratings must be based on the resident's demonstrated performance. Any resident who has not been trained using fire drills must be given the higher scores.

Residents must be rated assuming that a fire might find them in a common situation where they are least likely to respond well to an emergency. For most residents, this will be their evacuation ability after being awakened at night. The rating should not include difficulties in actually awakening the resident because of the large differences in how easy it is to wake up the same individual at various times of the night.

(a) *Initiates and Completes Evacuation Promptly.* Some examples of resident capabilities that score "no" for this item are:

1. The resident may not react to the alarm until alerted by a staff member.

2. The resident spends an excessive amount of time preparing to leave (for example, getting dressed, seeing what everyone else is doing).

3. The resident has a hearing impairment and therefore must be alerted by a staff member.

4. The resident is sometimes upset or confused and therefore may seek out a staff member before evacuating.

5. The resident will reliably start an evacuation, but is easily distracted and requires some supervision.

(b) *Chooses and Completes Back-up Strategy.* Residents that score "no" on this item will be those unlikely to select a good course of action if the primary escape route cannot be used; that is, they have not been trained to find alternative escape routes, find an area of refuge or perform other appropriate action. An example of resident capabilities that score "no" for this item is:

The resident lacks the conceptual ability to understand about fire hazards and blocked escape routes, and therefore needs supervision.

(c) *Stays at a Designated Location in a Safe Area.*

Some examples of resident's capabilities that score "yes" for this item are:

1. The resident has been specifically trained to remain at a designated location in a safe area, and has demonstrated this ability without the presence of staff members in three of the last four fire drills.

2. The resident is physically immobile, and therefore cannot leave the designated location.

3. The group home uses a motor vehicle (for example, a van or bus) or a building that is detached and remote from the home (for example, another house or a remote garage) as the designated location, and the resident has demonstrated in three of the last four fire drills that he or she will remain there without the presence of a staff member.

4. The resident may tend to wander, but a reliable resident has been assigned to keep the "wandering" resident at the designated location without using any force or coercion. Further, this arrangement has been demonstrated as effective in at least three of the last four fire drills.

Some examples of residents that score "no" for this item are:

1. The resident has not been trained to stay at a designated location without any staff supervision.

2. The resident has been trained to stay without staff supervision at a designated location, but has failed to demonstrate this capability in three of the last four fire drills.

Instruction Manual for Calculating Evacuation Difficulty Score (E-Score) (Worksheet F-2)

Requirements for Using the Evacuation Difficulty Score (E-Score)

While the use of the Evacuation Difficulty Score allows determination of the level of firesafety need for a variety of staff and resident combinations, the system is valid only when the following underlying requisites are satisfied.

(a) *Has a Protection Plan Been Developed and Written and Have All Staff Members Counted in the Calculation of E-Scores Been Trained in its Implementation?*

Regardless of the staff's everyday competencies, they cannot be relied on to innovate effective life safety actions under the extreme stress and time limitations of an actual fire emergency. Regardless of the building's protection features, staff must have a valid and practiced plan of action that can be immediately put into effect in an emergency. The protection plan should include the following features: (a) a description of all available evacuation, escape and rescue routes and the procedures and techniques needed to evacuate all the residents using the various routes, and (b) the fundamental knowledge about fire growth, containment and extinguishment needed to make reasonable judgments about action priorities and viable egress routes.

(b) *Is the Total Available Staff at any Given Time Able to Handle the Individual Evacuation Needs of Each Resident Who May Be in the Board and Care Home?*

In a well-protected building, it would be possible to have an E-Score which is passing in relation to the rating values for the fire protection features of the building, and still not have the total situation acceptable under this system. This would be the case where a resident is present who requires assistance from two staff members, but only one staff member is present. Thus, a facility must not only have a passing E-Score, but the situation must be such that every resident can be evacuated by available staff.

Exception: This requirement is waived when the following conditions are true:

(1) The building meets the criteria for impractical level of evacuation difficulty; and

(2) for any time when the question is answered "no":

(a) The resident whose evacuation needs cannot be handled is in a bedroom or other room that provides adequate refuge from fire outside the room, and

(b) There is at least one staff member present who can close the door to the room.

Example: A very heavy resident is in a building meeting the criteria for impractical level of evacuation difficulty with one staff member who cannot transfer the resident from his bed to his wheelchair. Although the staff member cannot meet all the resident's evacuation assistance needs, the problem arises only when the resident is in his bedroom and the bedroom provides adequate refuge.

(c) *Can Every Staff Member Counted in the Calculation of E-Scores Participate Meaningfully in the Evacuation of Every Resident?*

For example, a staff member, due to his or her own disability, may be unable to assist one or more physically disabled residents and, therefore, cannot be included in the calculation of the E-Score. However, if a staff member's disability does not limit his or her ability to assist the residents, then the staff member may be included.

(d) *Are All Staff Members Counted in the Calculation of E-Scores Required to Remain in the Dwelling Unit with Only the Exceptions Listed in the Instruction Manual?*

The procedure described in this Appendix for calculating an Evacuation Difficulty Score is based upon the assumption that the facility is always staffed when residents are in the building except as described below. Unstaffed buildings, not covered by these Exceptions, may be assigned an evacuation capability level based on the demonstrated ability of the residents to meet the criteria of 21-1.3 without staff assistance.

The Exceptions are as follows:

(1) Residents who receive only the most favorable ratings on the Worksheet for Rating Residents may be present in the dwelling unit without the presence of staff members.

(2) A staff member may be at a location outside of the dwelling unit when his/her ability to respond to a fire emergency from the location is roughly equivalent to his/her response ability from within the dwelling unit. In determining equivalency, the regulatory authority should consider: (1) whether the alarm meets the minimum loudness criteria (*see the Instruction Manual for Calculating Evacuation Difficulty Score*) at the locations outside the dwelling unit or whether another staff member who is required to remain in the dwelling unit can immediately notify the outside staff member of a fire emergency; (2) travel time to the dwelling unit; (3) detection of fire cues (e.g., smoke, noises) from the locations outside the dwelling unit; and (4) whether the staff member will be immediately notified about which area has the fire emergency, if the outside staff member is required to report to fire emergencies in more than one dwelling unit or fire zone.

The authority having jurisdiction can grant partial credit (not to exceed the Delay of Response score that the staff member would receive when required to remain in the dwelling unit) for staff members who are permitted to be at locations outside the dwelling unit, but who have an ability to respond promptly.

(e) *Were at Least Six Fire Drills Conducted in the Last Year?*

Any home in operation for less than one year should have had as many fire drills as months of operation to meet the requirement for proper number of fire drills. (Requirement is for 12 drills the first year and six all other years.)

Worksheet for Calculating the Evacuation Difficulty Score (E-Score) (Worksheet F-2)

I. Areas of Application of Evacuation Difficulty Score.

(a) Small Facilities (housing not greater than 16 residents). The evacuation difficulty score is based on all of the housed residents and the available staff measured in accordance with the criteria for evaluating residents and staff in this instruction manual.

(b) Large Facilities (housing greater than 16 residents). The evacuation difficulty score may be calculated on the basis of the entire building as with small dwelling units or on the basis of individual fire/smoke zones. The procedure providing the better, i.e., (lower), evacuation difficulty score may be used. A fire/smoke zone is a portion of the building

separated from all other portions of the building by building construction having at least 1-hour fire resistance and/or smoke barrier conforming to the requirement of Section 6-3 of the *Life Safety Code* for smoke barriers of at least 20-minute fire resistance. Zoning of the facility is also permitted in nonfire-resistive sprinklered buildings provided the construction separating one zone from another is sound and smoke resistant.

If a building is zoned, each zone shall be separately evaluated. Its evacuation difficulty score is based on the residents of that zone and the staff that is available to that zone in accordance with the staff availability criteria in this instruction manual.

When the area of application is by zone, a separate evaluation is to be made of zones that include common use spaces where the residents of more than one zone congregate for meals, recreation, or other purposes. In such cases, adjust the resident evacuation assistance scores as appropriate to reflect the needs residents would have under such conditions.

II. Finding Staff Shift Score (Worksheet F-2B).

If it is not obvious which time period has the highest E-Value, complete a separate worksheet for all candidate time periods and use the one having the highest E-Value.

Alarm Effectiveness. This factor concerns whether smoke detector-activated alarm devices are loud enough to dependably alert staff to a fire emergency.

(a) *Assured.* To be rated "assured," the alarm shall be "easily noticeable" in all locations where staff are allowed to go, regardless of their ratings on the promptness of response factor. To be "easily noticeable," the alarm shall be a minimum of 55 dBA measured at ear level. However, in order to be "easily noticeable," the authority having jurisdiction may require the alarm to be louder than 55 dBA where background noise interferes with alarm audibility. For example, the alarm may need to be more than 55 dBA in order to be loud enough to be heard over the noise of a washing machine in the laundry, a television in the living room, and so forth.

In addition, if there are staff who are allowed to sleep, the alarm shall be a minimum of 70 dBA measured at "pillow" level in any area where they may be asleep.

The alarm must be activated by one or both of the following:

1. Smoke detectors.
2. Sprinkler system.

If the facility has smoke detectors meeting the requirements of Chapter 21, the smoke detectors must activate the alarm. If the facility has a sprinkler system whose firesafety properties are considered in the firesafety evaluation of the building, activation of the sprinkler system must activate the alarm.

(b) *Not Assured.* The alarm does not satisfy the conditions specified under "Assured."

The loudness of the alarms is determined with doors, normally closed during the time period being rated, being closed, and with any other barriers that reduce the loudness of the alarms in place.

Staff Availability. This factor concerns whether there are circumstances when staff may be less able to respond appropriately or may be delayed in their response to a fire emergency.

Staff members shall be included in the ratings only if they are required to remain within the residence,* if they sleep less than 100 ft (30 m) from all locations in the portion of the facility being evaluated, and/or their travel time to any location in the portion of the facility being evaluated does not exceed 1 minute.

(a) *Standby or Asleep.* This means that the staff member does *not* have specific duties that assure an immediate response to the alarm, but that the staff member is otherwise available to assist in a timely manner. This category includes live-in staff who may be asleep, showering, or otherwise unable to respond immediately.

(b) *Immediately Available.* This means that the staff member is required to be available to offer immediate assistance, but is not required to remain in close proximity to the residents. For example, the staff member would be allowed to wash clothes or do bookkeeping.

(c) *Immediately Available and Close by.* This means that the staff member, in addition to satisfying the requirement for immediately available, is also required to remain in close proximity to the residents except for brief periods of time.

If the home is a large facility and has multiple fire/smoke zones, some staff may have responsibilities for residents outside the fire/smoke zone being evaluated. If their duties include rescue of residents in the fire zone being evaluated, they may be assigned partial or full promptness of response scores. The authority having jurisdiction shall assign the points based on the proximity of the staff members to the zone and the nature of their duties in a fire emergency. This credit will be given only if there is a smoke detection system that will alert the staff member and a system or procedure for promptly informing the staff member of the general location of the fire.

Residents may be assigned responsibilities similar to staff in assisting other residents during fire emergencies. The authority having jurisdiction may assign these residents up to 8 Promptness of Response points based on their capabilities and responsibilities.

III. Finding the Home's Evacuation Difficulty Score (Worksheet F-2C).

Vertical Distance from Bedrooms to Exits. This factor concerns the increased risk resulting from resident bedrooms that are located where residents must travel through another floor in order to get outside of the small dwelling.

Certain critical terms are defined as follows:

Direct Exit. This means that there is no more than one step between the inside of the dwelling and either (1) ground level outside or (2) a level area outside the dwelling that is at least 32 sq ft (3.0 sq m). This level area might be a porch or a stairway landing. When the vertical distance is greater than one step, a ramp may be used to satisfy this criterion.

Vertical Distance. This refers to the greatest number of floors that separates any resident bedroom from its nearest direct exit.

(a) *All Bedrooms on Floors with Direct Exits.* This means that every room where residents sleep is on a floor with at least one direct exit.

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*Exceptions to this requirement are listed in the Requirements for Using the Evacuation Difficulty Index.

Some examples of buildings that fall within this category follow:

1. A one-story house without bedrooms in the basement, or

2. A two-story house without bedrooms on the second floor, or

3. A split-level house with direct exits at each level, or

4. A two-story house with bedrooms on the second floor that has an exterior stairway from the second floor with a landing at the second floor which is greater than 32 sq ft (3.0 sq m).

(b) *Any Bedroom One Floor from Exit.* This means that there is at least one room where residents sleep where the shortest vertical distance to a direct exit is one floor.

Some examples of buildings that fall within this category follow:

1. A two-story building with bedrooms on the second floor and/or the basement, or

2. A one-story house where all the exits have stairs that lead to grade, without a landing, or porch of 32 sq ft (3.0 sq m).

(c) *Any Bedroom Two or More Floors from Exit.* This means that there is at least one room where residents sleep where the shortest vertical distance to a direct exit is two or more floors.

Some examples of buildings that fall within this category follow:

1. A three-story house with bedrooms on the third floor and no exterior fire escape, or

2. A three-story house with bedrooms on the third floor and a fire escape, but the landing to the fire escape is less than 32 sq ft (3.0 sq m).

If the board and care home is located in an apartment house and the unit containing the group home requires ascending or descending stairs to go from any bedroom to the exit to the corridor, assign a score of 1.2 for Vertical Distance from Bedrooms to Exits. Note: This special scoring of this rare type of apartment is not noted on the Worksheet. In all other apartments, the score for Vertical Distance from Bedrooms to Exits equals 1.