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BUILDING EXITS CODE

Eleventh Edition, 1951

Price $1.00

NATIONAL FIRE PROTECTION ASSOCIATION

International

60 Batterymarch St., Boston 10, Mass.

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National Fire Protection Association

INTERNATIONAL

Executive Office: 60 Batterymarch St., Boston 10, Mass.

The National Fire Protection Association was organized in 1896 to promote the science and improve the methods of fire protection and prevention, to obtain and circulate information on these subjects and to secure the cooperation of its members in establishing proper safeguards against loss of life and property by fire. Its membership includes over a hundred and seventy-five national and regional societies and associations and some thirteen thousand individuals, corporations, and organizations.

This book is one of a large number of publications on fire safety issued by the Association. The standards prepared by the technical committees of the National Fire Protection Association and adopted in the conventions of the Association, are intended to prescribe reasonable measures for minimizing fire losses. All interests concerned have opportunity through the National Fire Protection Association to participate in the development of the standards and to secure impartial consideration of matters affecting them.

NFPA No. 101 1951
ASA A9.1

Building Exits Code.

1951

This, the Eleventh Edition of the Building Exits Code (NFPA No. 101), adopted in 1950, supersedes the Tenth Edition, 1949. Revisions adopted include new recommendations for Outside Stairs, Section 1, Stairways (§§151-153); a change in the title of Section 2, Fire Escape Stairs (formerly "Outside Stairs") and provisions for single means of egress under adequate safeguards for "garden type" apartments, Section 28, Apartment Houses (§§2840-2841). There are also minor editorial changes as required by the revisions of the text. The details of changes are to be found in the 1950 *Advance Reports* and *Proceedings* of the National Fire Protection Association.

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Building Exits Code.

The Building Exits Code as printed herewith 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, such as the Binghamton Clothing Factory fire, the Iroquois Theatre fire, the Collinwood School fire, the Triangle Waist Company fire, the Arcadia Lodging House fire, and other similar disasters, 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 has been used with the other pamphlets as a groundwork for the present Code. These pamphlets were widely circulated and put into quite general use.

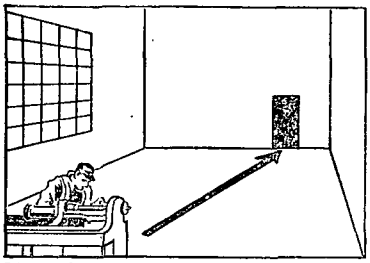
The committee continued its activities developing the detailed life safety requirements for additional classes of occupancy until in 1921 the National Fire Protection Association was requested by the American Standards Association to accept sponsorship for a Building Exits Code. At that time the committee was reorganized to qualify as a Sectional Committee of the ASA, a number of additional members being appointed for this purpose. Under new auspices the committee enlarged and extended its work, revising and perfecting the standards prepared in earlier years and extending the fundamental principles already developed to include additional occupancies. These reports in each year were printed, presented to the National Fire Protection Association and duly adopted. In the preparation of each occupancy section the groups affected were consulted. Material on the proposed code was published in the technical and trade press and otherwise given wide publicity. The reports have been thoroughly discussed at the conventions of the National Fire Protection Association and have also been presented at the meetings of a number of cooperating organizations.

The complete Building Exits Code has been published by the NFPA in successive editions as follows: First Edition, 1927; Second Edition, 1929; Third Edition, 1934; Fourth Edition, 1936; Fifth Edition, 1938; Sixth Edition, 1939; Seventh Edition, 1942; Eighth Edition, 1946; Ninth Edition, 1948; Tenth Edition, 1949. All these editions of the Code have been approved by the American Standards Association as American Tentative Standard for the early editions and as American Standard in editions since 1939. The current edition is being submitted to the American Standards Association for approval under ASA procedure.

NATIONAL FIRE PROTECTION ASSOCIATION.

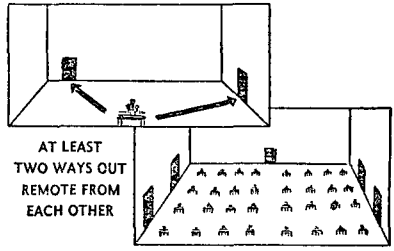
January 1, 1951.

PRINCIPLES OF EXIT SAFETY

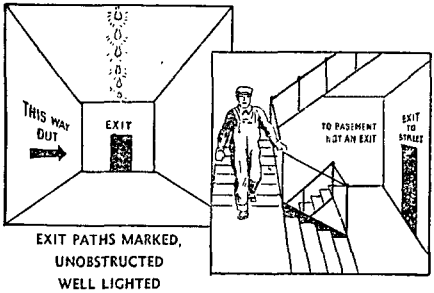


EXIT AVAILABLE IN REASONABLE TRAVEL DISTANCE

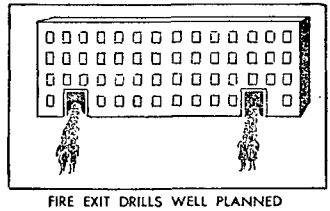
High fire hazard	75 feet
Average hazard	100 feet
Sprinklered building	150 feet



Additional exits according to number of persons and relative fire danger



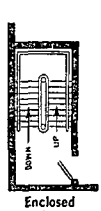
EXIT PATHS MARKED,
UNOBSTRUCTED
WELL LIGHTED



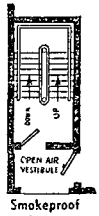
FIRE EXIT DRILLS WELL PLANNED
FREQUENTLY PRACTICED

PLAN VIEWS OF FAVORED TYPES OF EMERGENCY EXITS

Stair enclosure, usually of masonry, prevents fire on any floor trapping persons above. Smokeproof tower is better as opening to air at each floor largely prevents chance of smoke in stairway. Horizontal exit provides a quick refuge, lessens need of hasty flight down stairs. All doors shown are fire retardant doors.

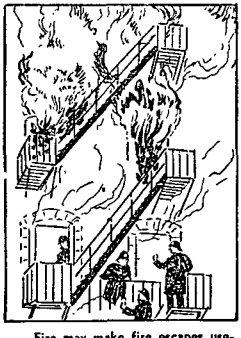


Enclosed stairway



Smokeproof tower stairway

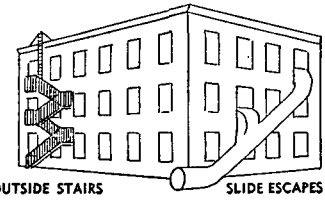
Horizontal exit



Fire may make fire escapes useless as this picture, drawn from photograph of actual fire, shows.

FIRE ESCAPES ARE MAKESHIFTS, OFTEN DANGEROUS

There's little safety where occupants have to clamber over window-sills to flimsy, steep, and weather-swept outside fire escapes. Substantial outside stairs and approved slide escapes may be used to provide exits lacking on existing buildings.



OUTSIDE STAIRS SLIDE ESCAPES

BUILDING EXITS CODE.

TABLE OF CONTENTS.

INTRODUCTION.

1. The purpose of this Code is to specify the number, size and position of exit facilities, sufficient to empty buildings promptly in case of fire or other emergency and to provide for construction and protection such that there will be no danger to life from fire, smoke or resulting panic before buildings are emptied. The Code recognizes that life safety is more than a matter of exits; that while in some buildings adequate life safety can be secured by means of exits alone, in most cases there are various other factors which must be considered. This Code accordingly covers various matters besides exits which are essential to life safety. The Code, for example, gives minimum requirements for construction which may be used in buildings of certain occupancies and specifies height limits above which buildings of certain construction and occupancy cannot be used with safety. The protection of property values has not been considered in this Code, although many of the life safety requirements incidentally contribute towards safety for property values.

2. While many of the provisions of this Code are necessarily based largely on engineering judgment, the principles and the applications of the Code have been checked by comparing them with all available actual fire experience, as well as with existing legal requirements and recognized good architectural practice. It can be readily shown that the buildings in which the major losses of life by fire have occurred have fallen far short of the standards of this Code. At the same time it is realized that neither the height and construction limits nor the exits specified herein will ensure absolute safety. The whole matter of life safety is comparative at best, and no possible code can assure 100% safety under all conditions. The intent of these requirements is to afford reasonable life safety without imposing unreasonable limitations or hardships on designers and owners.

3. Attention is called to the fact that the several Engineering Standards (Part A) are to be applied only in accordance with the provisions of the various Occupancy Sections (Part B). It is suggested, therefore, that the reader turn first to the particular Occupancy Section in which he is interested, later referring back to Part A for details of construction of the exit facilities.

4. The present Code includes sections on nine occupancies: schools, department stores, factories, hospitals and sanitariums, places of public assembly, hotels, office buildings, apartment houses, jails, penal institutions. It is the intention eventually to add other occupancy egress sections to cover all the recognized classes of occupancy. Pending the preparation of other occupancy egress sections the principles established in Section 20, 21, 22, 23, 24, 25, 26, 27, 28, and 29 may be used as a guide in determining exits for types of structures not now specifically covered.

5. The exit provisions in this Code are based upon the use of interior finish materials of ordinary types such as wood or plaster. Where interior finish materials are used having a higher combustibility, greater rate of fire spread, or potentialities of greater generation of smoke or fumes than wood, the exits specified in this Code may not be sufficient to provide adequate life safety from fire.

Scope and Purpose.

10. SCOPE. This Code covers the construction, arrangement and use of exit facilities necessary to provide safe means of egress from structures,

together with such features of construction and protection as have bearing on safety of egress.

11. The purpose and intent of this Code is to provide reasonable life safety. In cases of practical difficulty or unnecessary hardship, the enforcing authority may grant exceptions from this Code, but only when it is clearly evident that reasonable safety is thereby secured.

12. NEW AND OLD INSTALLATIONS. This Code covers both new and existing construction. In various sections of the Code specific modifications for existing structures will be found. Except where such modifications are specifically authorized the requirements of the Code apply to both new and old structures and installations.

No changes or alterations shall be made in any building or structure, whether new or existing, except in conformity with the provisions of this Code.

Except as may be otherwise specifically provided, no change of occupancy, whether necessitating physical alterations or not, shall be made in any building or structure, unless such building or structure conforms with the requirements of this Code applying to new buildings of the proposed new use.

13. REFERENCE TO OTHER CODES. This Code is supplemented by various other A.S.A. American Standard Codes in accordance with the references thereto which will be found in various portions of the text. Copies of these Codes are obtainable upon request to the American Standards Association, 70 E. 45th St., New York. These Codes are:

American Standard Safety Code for Elevators, Dumb Waiters and Moving Stairways, A.S.A. A-17.1-1937 with supplement A-17.3-1942.

American Standard Safety Code on Floor and Wall Openings, Railings, and Toeboards, A.S.A. A-12-1932.

American Recommended Practice of Industrial Lighting, A.S.A. A-11-1942.

American Recommended Practice of School Lighting, A.S.A. A-23-1948.

American Recommended Practice of Office Lighting.
(Illuminating Engineering Society, 51 Madison Ave., New York.)

14. This Code makes reference to the standards recommended by the National Fire Protection Association for various matters of fire protection. All references to these standards in this Code apply to the editions current at the date of publication of this Code, as identified by the dates in the following list. These standards, obtainable from the National Fire Protection Association, 60 Batterymarch Street, Boston, are those on:

Air Conditioning, Warm Air Heating, Air Cooling and Ventilating Systems (NFPA No. 90), 1950.

Sprinkler Equipments (NFPA No. 13), 1950.

Central Station Protective Signaling Systems for Watchman, Fire Alarm and Supervisory Service (NFPA No. 71), 1949.

First Aid Fire Appliances (NFPA No. 10), 1950.

National Electrical Code (NFPA No. 70), 1951.

Nitrocellulose Motion Picture Film (NFPA No. 40), 1939, amended 1948.

The NFPA standards listed above and on page 8 are included in National Fire Codes, Vol. I, Flammable Liquids, Gases, Chemicals and Explosives, or, Vol. III, Building Construction and Equipment, or, Vol. IV, Extinguishing and Alarm Equipment, or, Vol. V, National Electrical Code.

Photographic and X-Ray Nitrocellulose Films (NFPA No. 41), 1930.
Private Fire Brigades (NFPA No. 27), 1949.
Proprietary, Auxiliary and Local Systems for Watchman, Fire Alarm and Supervisory Service (NFPA No. 72), 1950.
Protection of Openings in Walls and Partitions Against Fire (NFPA No. 80), 1939.
Standpipe and Hose Systems (NFPA No. 14), 1949.

Definitions.

20. The word "shall" is mandatory and the word "should" is advisory.

21. The word "approved" means approved by the authority having jurisdiction.

22. The word "new" referring to buildings or exit facilities means that which is constructed or erected subsequent to the date at which this Code goes into effect. The word "existing" refers to that which is already in existence at the time when this Code goes into effect.

23. UNIT OF EXIT WIDTH. The width required for the free passage of one file of persons, as specified in Pars. 147, 271, 302, 504, 936.

24. EXIT. An exit is a way of departure from the interior of a building or structure to the open air outside at the ground level. It may comprise vertical and horizontal means of travel such as doorways, stairways, ramps, corridors, passageways and fire escapes, including all elements necessary for the purpose of emergency escape from the building or structure.

NOTE. In 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 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 means of escape from the room, are not ordinarily referred to as exits, but in a large room, such as a school auditorium, the doors constitute an integral part of the exit system and are referred to as exits from the room. An interior aisle, corridor or hallway used to reach a stair or door exit is not ordinarily referred to as an exit except where it is so located, arranged and enclosed as to constitute an integral part of a system of travel as described in the preceding paragraph.

A single exit is one separate path of travel to the outside of the building at ground level. Two doorways which are remote from each other and which provide separate paths of escape constitute two exits, but if the doorways are adjacent and lead to a common passageway or stairway to the outside of the building they constitute a single exit.

Distance to an exit is measured along the natural path of travel: (a) to a door opening directly to the street or open air, (b) to a door to a stairway enclosure, or (c) to a door in a fire wall or otherwise giving access to a place of safety.

Width of exits is measured at their narrowest point between railings or obstructions except that hand rails and door jambs may project for certain specified distances without reducing the rated width.

Definitions of Building Construction.

31. AREA OR FIRE AREA. The area of any one story included within enclosure or fire walls.

33. BULKHEAD OR PENT HOUSE. A superstructure on or above a roof. When only an enclosure for stairways, elevators, or elevator machinery, tanks, ventilating or other equipment, or for janitor's quarters, it does not constitute a story in the determination of heights in this Code.

34. FIRE AREA. See Area.

35. FIRE PARTITION. A partition providing an area of refuge from fire in a building during the egress of the occupants.

36. FIRE-RESISTIVE. Materials or construction which will satisfactorily resist the effects of severe fire.

37. FRAME CONSTRUCTION. Construction in which wooden framework forms the structural support for enclosure walls, floors and roof.

38. HEIGHT OF BUILDING. For the purpose of heights specified in number of stories, the basement (or ground story) shall be considered as a story if the floor of the principal story ("first floor") is more than 8 ft., 6 inches above the grade level at any point next to the building. Service and entrance areaways encompassing not more than 10 per cent of the perimeter of the building may be omitted from the determining grade level.

NOTE. This is to prevent evasion of requirements, e.g., by designating as "two story and basement" a building which, from a life safety standpoint, is really a three story building.

39. NONCOMBUSTIBLE. Structures or materials which will not readily ignite and burn when subjected to fire.

NOTE. Treated wood is not considered noncombustible.

40. MILL OR "SLOW-BURNING" CONSTRUCTION consists of substantial masonry walls and heavy timber interior construction so designed and arranged as to avoid concealed spaces and to expose the least number of corners or projections.

41. ORDINARY OR JOISTED CONSTRUCTION. Construction having enclosure walls of masonry with floors and partitions of wooden joist and stud construction.

42. PUBLIC ASSEMBLY. See Section 25 for definitions of various special terms used in this occupancy section.

PART A.

ENGINEERING STANDARDS

Section 1.

STAIRWAYS.

101. The following requirements apply to all stairways except that the enforcing authority may exempt intercommunicating and similar stairways not constituting required means of egress which are so located and arranged as not to be subject to use as principal exits; provided that in no case shall the requirements be waived for enclosures to prevent the spread of fire and smoke, except as open stairs to balconies and in other special situations are specifically permitted by other sections of this Code.

General Requirements.

(Applying to all types of stairs.)

102. All new stairs (and platforms, landings, etc., used in connection therewith) in buildings four stories or more in height and in all new buildings of fire-resistive construction shall be of noncombustible construction throughout. (Handrails are exempted from this requirement.) Treads of stairs and landing floors shall be solid (without perforations).

103. All stairs, platforms, landings, balconies, and stair hallways shall be of sufficient strength to sustain safely a live load of not less than 100 lbs. per square foot with a factor of safety of 4.

104. There shall be no variation in the width of treads and the height of risers in any flight. Where variation in heights of risers in different flights is necessary on account of varying story heights, such variation shall not exceed 3/16 inch. All treads less than 10 inches wide shall have a nosing or an effective projection of approximately one inch over the level immediately below.

105. Where material of stair treads and landings is such as to involve danger of slipping, non-slip material shall be provided on tread surface.

106. The space beneath any stairway built in whole or in part of combustible material shall be left entirely open or be completely enclosed without door or other opening.

NOTE. This is to prohibit closets and similar spaces under stairs. It is not to be interpreted to prohibit an enclosed flight of stairs beneath another flight.

107. No arrangement of treads known as winders shall be permitted in new stairways.

NOTE. Winders are permitted only in Class C Stairs, existing stairs in existing buildings, and are penalized by reduction in stair capacity rating.

108. Stairways and intermediate landings shall continue with no decrease in width along the direction of exit travel, except that existing

stairs with decrease in width may be accepted, subject to the provision that the narrowest point shall determine the rated width for all floors above that point (or below in the case of basements).

Arrangement and Access.

109. In buildings of non-fire-resistive construction more than three stories high with roofs having a slope of less than one foot in four, at least one stairway shall extend through the roof. Where roofs are used for roof gardens or similar occupancies, stairways shall be provided in compliance with requirements for other parts of the building. Class C stairs may be used for access to unoccupied roofs.

110. Unless otherwise permitted by requirements for individual occupancies, all stairways shall lead to the street directly or by way of a yard, court, or fire-resistive passage (§111) with width at least equal to the aggregate widths of all the exits discharging through it, except that where two or more stairways discharge through such passage, the required passage width to serve such stairways may be three-quarters of the combined width of the stairways (plus the width necessary to serve required exit doors opening into the passage).

For exception for Sprinklered Department Stores see §2208.

111. Where stairways discharge through fire-resistive passages (see §110) such passages shall be not less than 8 ft. in height for new buildings and 7 ft. in height for existing buildings. Where there is communication between the passage and the street floor all such openings shall be protected by standard fire doors. In the case of smokeproof towers, passages shall be unpierced.

112. All exits shall be so located that they are readily accessible and visible. All stairs which may be used for exit purposes shall be so arranged as to make clear the direction of egress to the street.

NOTE. This rule is made to prohibit the extending of stairs to the basement in such a way that persons descending from upper floors might unknowingly continue to the basement.

113. Every doorway serving an exit stairway shall provide units of doorway width at least equal to the number of units of stairway width required at that point to serve the floor from which the stairway leads.

Doors. (See also Section 5.)

114. Doors shall not open immediately on a flight of stairs, but on a landing at least the width of the door.

115. Doors giving access to stairways shall swing in the direction of exit travel, but where swing doors are not practicable, sliding doors may be permitted by the enforcing authority for Class C stairs. There shall be no obstructions to doors or on stairs or landings. Swinging doors during their swing should preferably not reduce the effective width of stairs or landings (and shall not in Class A stairs) and in no case shall any door at any point in its swing reduce the effective width of stair or landing to less than 22 inches, nor when open interfere with the full use of the stairs.

116. Doors from stairways to outside the building shall swing out, and be so arranged as not to restrict the effective width of the stairs.

Railings.

117. All stairs shall have walls or well secured balustrades or guards on both sides and shall have handrails on both sides. Any stairway 88 inches or more in width shall be provided with one or more continuous intermediate handrails substantially supported; the number and positions of intermediate handrails to be such that there will be not more than 66 inches between adjacent handrails. The approach newels of intermediate handrails shall be at least 6 ft. high. (See §2128 for special requirements for schools.)

118. Handrails and railings shall be in accordance with the requirements of the A.S.A. American Standard Safety Code on Floor and Wall Openings, Railings, and Toeboards (A-12-1932), in so far as applicable.

Lighting and Signs.

119. Every stairway, the corridors and passageways appurtenant thereto shall have illumination and signs in accordance with Section 12.

Class A Stairs.

120. Class A Stairs are intended for main stairs for places of public assembly or elsewhere, where large crowds must be accommodated.

121. Stairs shall be at least 44 inches wide. All such widths shall be clear of all obstructions except that handrails attached to walls may project not more than 3½ inches at each side within the required width. If newels project above tops of rails, a clear width of at least 44 inches shall be provided between the face of the newel and the face of the wall or newel opposite.

122. Treads and risers shall be so proportioned that the sum of two risers and a tread, exclusive of its projection, is not less than 24 nor more than 25 inches. No riser shall be more than 7 inches and no tread less than 10 inches exclusive of its projection. (See §104 for projection requirements.)

122A. No flight with less than three risers shall be used, except as permitted by §2562 for theatre aisles.

NOTE. Ramps should be used where differences in level are small.

123. No stairway shall have a height of more than 8 ft. between landings. Intermediate landings on straight run stairs shall have a dimension of not less than 44 inches measured in the direction of the run. (Par. 108 controls the minimum dimensions of other landings.)

124. The walls at the outer corners of landings should be curved on a radius of at least two feet or in a forty-five degree splay not less than 20 inches wide. The required width of landings of Class A Stairs shall not be encroached upon by any door during its swing.

125. Swinging doors only shall be used in connection with Class A Stairs.

Class B Stairs.

126. Class B Stairs are intended for new construction for buildings of virtually all occupancies not covered by Class A. The Type B Classification is intended also to cover existing stairs in existing buildings where Class A Stairs would be specified for new construction.

127. Stairs shall be at least 44 inches wide. All such widths shall be clear of all obstructions except that handrails attached to walls may project not more than 3½ inches at each side within the required width. If newels project above top of rails, a clear width of at least 44 inches shall be provided between the face of the newel and the face of the wall or newel opposite.

128. Treads and risers shall be so proportioned that the sum of two risers and a tread, exclusive of its projection, is not less than 24 nor more than 25 inches. No riser shall be more than 7¾ inches and no tread less than 9 inches exclusive of its projection (see §104 for projection requirements).

129. No stairway shall have a height of more than 12 feet between landings. Intermediate landings on straight run stairs shall have a dimension of not less than 44 inches measured in the direction of the run. (Par. 108 controls the minimum dimensions of other landings.)

130. Swinging doors only shall be used in connection with Class B Stairs.

Class C Stairs.

131. Class C Stairs are intended to cover existing stairs which although below the standard for new construction (Type B) are acceptable in most existing buildings; also for certain limited applications to roof stairs for new construction.

132. Stairs shall be at least 36 inches wide clear of all obstructions other than handrails. The minimum clear width inside handrails shall be 29 inches.

133. The pitch of stairs shall not exceed 45 degrees, and the treads, exclusive of nosings or projections shall not be less than 8 inches wide. Where permitted in new construction, Class C stairs shall comply with §128.

Substandard Stairs.

134. In existing buildings where stairs do not comply with the foregoing requirements they may be accepted as Class C Stairs subject to the following reductions from the rated number of units of width (see §147).

(*a*) **Excessive Pitch**

45° to 50°, deduct 40%
50° to 55°, deduct 65%
55° to 60°, deduct 80%

(*b*) Substandard Width of Tread (Does not apply if deduction has already been made for substandard pitch).

7 in. to 8 in. (exclusive of nosing or projection) deduct 20%
6 in. to 7 in. (exclusive of nosing or projection) deduct 40%

(*c*) WINDERS. Where there are winders measurements of tread, width and pitch shall be taken at one foot from the narrow end. These reductions apply in addition to those of (*a*) and (*b*).

One winding stair tread, deduct 25%.
Each additional stair tread, deduct 1%.
(Maximum deduction not to exceed 75%.)

(*d*) No stair having an inclination with the horizontal of more than 60° nor a tread (exclusive of nosing or projection) of less than 6 in. shall be permitted in any case.

Stairway Enclosures.

135. All stairways except where open stairways are specifically permitted by other sections of this Code shall be enclosed in standard fire-resistive or fire-retardant stair shafts, as specified in the following paragraphs. Enclosures shall include all landings or parts of floors between stairways which lie in the path of travel down stairways, so that once inside the enclosure persons may go from any part of the stairway to the outside exit without leaving the enclosure.

Stairway enclosures shall not be used for storage and shall not contain any material or equipment liable to cause fire or panic.

136. "Monumental" stairs (as used in public buildings, stores, etc.) leading from the street floor to the second floor (and the basement), which do not constitute required means of exit, are exempted from stairway enclosure requirements provided that they are effectively cut off at the second floor (and basement) by partitions having fire resistance at least equal to that of the required stair enclosure.

NOTE. Such partitions need not be immediately at the head (or foot) of the stairs, but when located away from the stairs the space between stairs and partition shall not be used for any purpose other than as a passageway to or from the stairs.

Type 1 Enclosure (Smokeproof Tower). This enclosed stairway, exterior access, is recommended as the best type, except where balconies are subject to exposure by fire in a hazardous occupancy.

137. Stairways shall be completely enclosed by brick or concrete walls or walls of other materials having adequate structural strength and fire resistance to withstand a severe fire. The enclosure shall extend from the sidewalk, court, or yard level to a roof bulkhead or penthouse, (except where §109 permits stairways not extending the full height of the building). There shall be no openings in walls separating the enclosure from the interior of the building. Fixed or automatic fire windows are permitted in an exterior wall not subject to severe fire exposure hazard from the same or nearby buildings. The stairs, landings, platforms and balconies of smokeproof towers shall be solid (unpierced) and made of noncombustible materials throughout, except that handrails may be of wood.

138. Stairways of smokeproof towers shall provide continuous uniform egress from the roof and all stories to grade, (except where §109 permits stairways not extending the full height of the building).

139. Access to the stairway shall be provided from every story through vestibules open to the outside on an exterior wall or from balconies overhanging an exterior wall, but not subject to severe fire exposure hazard. Every such vestibule, balcony or landing shall have an unobstructed length and width not less than the required width of exit doors serving same, and shall be directly open to a street or alley or yard or to an enclosed court open at the top not less than 20 feet in width and 1000 square feet in area. Balconies or vestibules shall have solid balustrades not less than four feet

high, or shall have railings complying with the requirements for railings of Class A fire escape stair balconies (§§225, 226). Wall openings exposing balconies or vestibules shall be protected in accordance with §234.

140. Access from the building to vestibules or balconies shall be through doorways not less than 40 inches wide for new and 36 inches wide for existing towers. These openings and the entrances to the towers shall be provided with approved, self-closing fire doors swinging with the exit travel. Where locks or latches are provided, they shall be of an approved, pressure release type, extending on the latch side not more than two-thirds the width of the door. Clear wired glass not exceeding 720 square inches shall be provided in all doors giving access to the enclosure.

141. The level of the vestibule or balcony floor shall be placed approximately 7½ inches below the floor level of each story where climatic conditions involve the possibility of blocking doors by snow or ice. In mild climates in which this hazard is not presented, the floors shall be approximately level. There shall be no step from the vestibule or balcony into the stair enclosure.

Enclosed Interior Stairways.

142. GENERAL REQUIREMENTS. Doors shall comply with Section 5. The width of exit doors shall be not less than the required minimum effective width of the stairway; except where two or more stairways discharge through a common passageway. (See §110.)

The bottom or exit way from the enclosure shall be at least equal in fire-resistance to the enclosure.

The stairs, landings, platforms and passageways connected therewith shall be completely enclosed by fire-resistive walls or partitions substantially constructed as specified in §§143-145.

142A. At the top of every new stairway enclosure (except where stairway does not extend to the top story), metal frame and sash skylights shall be provided, with an area at least three quarters of the area of the shaft.

Glazing shall be plain glass protected by a substantial wire screen beneath. In lieu of a skylight, equivalent window openings glazed with plain glass, may be provided in penthouse walls.

NOTE. This requirement for skylights also applies to other enclosures such as elevator shafts which are required by other sections of the code to comply with the requirements for stairway enclosures.

143. **Type 2 Enclosure.** Brick or concrete walls, or walls of other material having structural strength and fire resistance adequate to withstand a severe fire.

144. **Type 3 Enclosure.** Brick, concrete, hollow building tile or gypsum block walls, or walls of other material having structural strength and fire resistance adequate to withstand a fire of moderate severity.

145. **Type 4 Enclosure.** Partitions of wood studs protected on both sides with gypsum or cement plaster on metal lath, fire-stopped with noncombustible materials at each floor level, or partitions of other material having structural strength and fire resistance adequate to withstand a fire of slight severity.

146. **Type 5 Enclosure.** Partitions of wired glass in metal framework.

NOTE. Wired glass enclosures can be constructed to provide a considerable degree of fire resistance, but as they may permit persons in stairway enclosures to see fire, with consequent possibility of panic, their use is seldom recommended except where their primary purpose is protection against smoke.

Unit of Stair Width.

(Applies to all classes of stairs.)

147. The unit of stairway width (referred to in occupancy sections as a measure of exit capacity) shall be 22 inches. Fractions of a unit shall not be counted except that—

(*a*) In existing buildings a stairway 40 inches wide may be accepted as 2 units.

(*b*) A credit of 50% of a unit shall be allowed for 12 inches of stair width added to one or more 22 inch units of stair width.

(*c*) Substandard Class C Stairs shall be rated at a fraction of their actual units of width reduced in accordance with §134.

Outside Stairs.

151. Any permanently installed stair of noncombustible construction outside of the building served may be accepted as required means of egress, provided that such stairs comply with all the requirements hereinbefore stated for inside Class A or B stairs, except for enclosures and relation of treads and risers (§123 and §128 first sentences) provided that such stairs are not more than one story in height.

NOTE. Outside stairs may be considered as not subject to obstruction by snow or ice where the building is in a climate not subject to snow or ice, where a roof or canopy is provided to prevent snow or ice accumulation on the stairs, or in the case of main entrance stairs providing the principal access to a building where it may be assumed that normal use of the building will require removal of snow and ice as a necessary condition for the entrance of occupants.

152. The requirements for illumination of stairways specified in §119 and Section 12 may be satisfied for such outside stairs by street lights or any other exterior illumination normally present which provides the degree of intensity of illumination of the stairway surface specified by Section 12.

153. Subject to the approval of the enforcing authority, 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 all other reasonable requirements for life safety are maintained.

Section 2.
FIRE ESCAPE STAIRS.
(Fire Escapes.)

201. Fire escape stairs may be used as required means of exit only in existing buildings, subject to the provisions of the occupancy section applying. Fire escape stairs shall not constitute more than 50% of the required exit capacity in any case. Fire escape stairs shall not be used on new buildings.

NOTE. Fire escape stairs are regarded as at best only an expedient permitted to remedy deficiencies in the exit capacity of existing buildings where conditions do not justify the expense of providing additional inside stairways.

The fire escape stairs specified by this code are far superior to the ordinary fire escapes which are commonly found on existing buildings. These utterly inadequate, flimsy, precipitous fire escapes, unshielded against fire in the structure to which they are attached, are positively a menace because they give a false sense of security. Such escapes are not recognized by this Code as exits.

Even the superior fire escape stairs constructed in accordance with this Code have serious limitations which may prevent their effective use in time of fire. Even where window protection is provided conditions may be such that fire (or the smoke from fire) on lower floors may render the stairs impassable before the occupants of upper stories have had time to use them. Fire escape stairs may be blocked by snow, ice or sleet at the time when they are most needed. Persons using fire escape stairs at a considerable height are likely to be timid and to descend the stairs, if at all, at a rate much slower than that which obtains on stairs inside buildings. This applies to some extent even with the solid tread stairs which are specified by this Code in place of the ordinary slatted tread construction. Fire escape stairs are not a usual means of egress. Occupants of buildings will not so readily use them in case of fire as they will use the usual means of exit, the inside stairway. Because they are an emergency device not ordinarily used their proper up-keep may be neglected.

202. Fire escape stairs, subject to the limitations of §201, shall be treated on the same basis as ordinary inside stairs in calculation of exit capacity. The reductions of §134 applying to substandard inside stairs apply also to fire escape stairs.

Types.

203. The following types of fire escape stairs are recognized by this Code:

Return platform type, superimposed runs

Straight run type, with platforms continuing in the same direction.

Either of these may be parallel to or at right angles to the building. They may be attached to buildings or erected independently of them and connected by bridges.

204. The following types of fire escapes are not recognized by this Code and are prohibited:

Spiral stairs.
Ladders in any form.

Protection and Arrangement.

205. Stairs shall be protected against fire in the building (or smoke therefrom) in one of the following ways, which are listed in the order of desirability:

(*a*) Stairs enclosed in noncombustible towers, affording protection against weather, smoke, or fire, and with access through outside balconies or vestibules.

NOTE. This class of protection is not the equivalent of the standard smokeproof tower. If enclosures conform to the smokeproof tower standard (§§137-141) the exit should be classed as a smokeproof tower. If stairs are so enclosed as to be substantially equivalent to an inside stairway, they should be so classed and should conform to Section 1.

(*b*) Stairs entirely shielded by blank walls, access from wall openings to stairs being by balconies.

(*c*) Stairs shielded by approved *stationary* metal frame windows glazed with wired glass, access from entrance to stairs being by balconies.

206. Where climate is such as to involve the possibility of blocking by snow or ice, roofs are recommended for fire escape stairs, also enclosures for stairs of the return platform or superimposed type.

207. Fire escape stairs shall be so located and protected that they will lead by a safe path of travel to the street, in accordance with §§110-111 in so far as applicable.

208. Fire escape stairs shall extend to the roof where building is fire resistive, or where access to an adjoining building is possible from the roof or where the roof is accessible by extension ladder from the ground or from an adjoining building. In all cases where stairs do not extend to the roof, a permanent ladder for the use of the fire department should lead to the roof, as specified in §236.

Materials and Strength.

209. Iron, steel, or concrete shall be used where structural strength is required; elsewhere other noncombustible materials may also be used. No wood shall be employed (unless stairway is so enclosed as to class as an inside stairway as per §205 (a) Note.)

210. Balconies and stairs shall be designed to carry a load of 100 lbs. per sq. ft., with a factor of safety of 6.

NOTE. This factor of safety is larger than ordinary practice, and is recommended because outside stairs and balconies are usually subject to weakening through corrosion.

211. Stairs shall be designed to support a concentrated load of 200 pounds at the center of each tread with a factor of safety of 6.

212. Minimum dimensions of any structural metal member shall be ¼ in. Except where a suitable fire resistive and waterproof covering is provided, no structural metal member shall be employed the entire surface of which is not capable of being inspected and painted.

213. 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. Where metal members pass through walls, they shall be protected effectively against corrosion.

214. Balcony and stair enclosures and railings shall be designed to withstand a horizontal pressure of 50 lbs. (with factor of safety of 6) per running foot of railing or enclosure without serious deflection, and support at walls for such railings or enclosures shall be in the manner specified in §213 for tension members.

Class A—Fire Escape Stairs.

NOTE. Class A is a superior type of fire escape stair, is always recommended where fire escape stairs are permitted, and is required under certain conditions of height and occupancy.

Stairs and Balconies.

215. Stairs shall be at least 44 in. wide. Such width shall be clear of all obstructions except that handrails may project not more than 3½ in. into the required width at each side.

216. The minimum horizontal dimension of any landing, platform, balcony, or passageway shall be not less than the width of the stairs and in no case less than 44 in. Such dimensions shall be measured in the clear inside all enclosures or obstructing parts, except hand rails.

217. The rise of the stairs shall not be more than 7¾ in. and the tread not less than 9½ in. exclusive of nosing (maximum pitch approximately 39°). Nosing not less than 1 in. wide shall be provided.

218. Treads of stairs and balcony floors shall be solid except that perforations not exceeding ½ in. in diameter may be used for purposes of drainage. Balcony floors should be pitched to secure drainage.

NOTE. Reinforced concrete, checkered steel plates, and safety floorings are among the materials available for solid tread and floor construction.

219. Where tread or floor surface is such as to involve danger of slipping, suitable non-slip surface shall be provided.

220. Solid risers for stairs shall be provided, preferably in the form of "skirts" extending down from the under side of tread, leaving 1 in. open space for drainage between lower edge of riser and top of tread below.

221. Winding stair treads shall not be used.

222. Stairs shall be built permanently to the ground, no swinging section being permitted.

NOTE. Where it is necessary to prevent free access from the ground to the stairs in order to protect against burglary a door may be placed at the first riser or at a suitable platform. This door shall be opened from the stair side by means of approved panic hardware. Such door shall be protected from the weather by means of a roof or canopy. (Doors are not recommended and should be used only where absolutely necessary.)

223. The maximum vertical distance between platforms or landings shall not exceed 12 ft.

NOTE. Designs involving many landings and short flights of stairs are not recommended.

224. The minimum headroom at all points on balconies and stairs shall be 7 ft. 6 in., measured vertically.

Enclosures and Rails.

225. Enclosures for balconies and stairs shall be provided not less than 5 ft. high (for stairs, measure from center of tread).

226. Enclosures may be of solid, slatted, grille or screen construction, in no case with openings having a horizontal width of more than 3 in.; provided that if a lower rail is employed, not less than 2 in. and not more than 6 in. above the balcony floor, the space above such rail may have horizontal openings of not more than 6 in.

227. Enclosures or rails not less than 36 in. high and continuous with the stair rails shall be provided on the stair well side of balcony openings.

228. Handrails approximately 33 in. above the forward edge of the tread (measured in line with the face of the riser) shall be provided on both sides of stairs. Construction shall be such that there will be no obstructions tending to break hand hold.

NOTE. For schools which small children attend, it is advisable to provide additional hand rails about 27 in. high.

Access.

229. Access to Fire Escape Stairs shall be through doorways flush with the floor.

230. Approved doors or casement windows, swinging with the exit travel, shall be used in exit openings. The minimum clear width of individual openings shall be 30 in. and the minimum height 6 ft. 6 in. The aggregate width of doors or casement windows leading from any story to a fire escape stair shall be at least equal to the width of the fire escape stair or balcony to which they give access.

231. Doors and casement windows shall swing so as not to interfere with exit travel or reduce required effective width of openings or passageways or balconies. Locks, if employed, shall not require key to operate from inside, except as locking be specifically permitted by occupancy sections. (See Section 24 Hospitals and Sanitariums). Unlocking mechanism shall not require stooping to operate it.

NOTE. In factory, mercantile, theatre, school and office buildings and in other buildings as required by occupancy sections doors shall be kept continually unlocked while buildings are occupied. Where doors are required to be kept unlocked and for operating reasons it is undesirable to allow unrestricted communication between building and fire escape stairs, doors may be provided with alarms. (See §503.)

232. No gratings, bars, or other obstructions, shall be placed at or over any exit opening (except as provided in occupancy sections applying to hospital and sanitarium buildings). Fly screens may be permitted if they are free from heavy cross members and are arranged to open out in a manner which will not interfere with exit travel and are not held closed other than by a spring or a simple readily operated latch.

233. Where doors or casement windows lead to outside balconies, the level of the balcony floor shall be approximately 7¾ in. below the sill level, where climate is such as to involve the possibility of blocking doors

by snow or ice; where climate is not such as to involve this possibility the balcony should preferably be level with the sill.

Protection of Openings.

234. Fire escape stairs shall be so arranged that they will be exposed by the smallest possible number of window and door openings. Openings other than those used as a means of exit should preferably have stationary metal frames and wired glass. There shall be no transoms over doors. Every opening, any portion of which is in the limits specified below, shall be completely protected by approved fire doors or metal frame wired glass windows as follows:

(*a*) Horizontally. If within 15 ft. of any balcony, platform, or stairway, constituting a part of the escape proper. This provision does not apply to a platform or walkway leading from the same floor to the escape proper. Protection need not extend around a right angle corner (outside angle 270°) of the building except where stairs are close to such corner.

(*b*) Below. If within three stories or 35 ft. of any balcony, platform, walkway, or stairway constituting a part of the escape proper, or within two stories or 20 ft. of a platform or walkway leading from any story to the escape proper.

(*c*) Above. If within 10 ft. of any balcony, platform, or walkway, as measured vertically, or from any stair treads, as measured vertically from the face of the outside riser.

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

235. Where fire escape stairs are located in courts the least dimension of which is less than one third their height, or in alcoves having width less than one third of their height and depth greater than one quarter of their height, all openings below shall be protected.

Ladders for Fire Department.

236. Where stationary ladders are carried from top balcony to roof (see §208) the following specifications shall apply:

(*a*) Material shall be iron or steel.

(*b*) Rails shall be not less than 2 in. by ½ in.

(*c*) Distance between rails shall be not less than 16 in.

(*d*) Distance between rungs shall be 12 in. in every case, top rung to be within 6 in. of the level of the roof line (or parapet, if a parapet extends above roof line).

(*e*) Rungs shall have diameter not less than ⅞ in. and be riveted in position.

(*f*) Rails shall be supported at intervals of not more than 10 ft.

(*g*) Rails shall extend not less than 45 in. above roof line, or 45 in. above coping or parapet if there is one.

(*h*) Extension of side rails to roof shall be carried over coping or parapet to afford hand hold.

(*i*) Ladders shall be arranged parallel to buildings, with travel either between ladder and building, in which case minimum clearance between center of rungs and building shall be 27 in., or outside of

ladder, in which case minimum clearance between center of rungs and building shall be 6½ in.

(*f*) Ladders shall be vertical, or may be positively inclined. No negative incline (ladder sloping out over head of person using it) shall be permitted.

See §§262-270 for additional requirements on Lights, Signs, and Maintenance applying to Class A Fire Escape Stairs.

Class B—Fire Escape Stairs.

237. Class B Fire Escape Stairs shall conform to all the preceding requirements for Class A except as modification of requirements is permitted by the following.

Stairs and Balconies.

238. Stairs shall be at least 22 in. wide between rails. (Instead of 44 in. as per §215.) The minimum horizontal dimension of any landing, platform, balcony or passageway shall be 22 in. (Instead of 44 in. as per §216.)

239. The pitch of stairs shall not exceed 45 degrees. Rise shall not exceed 9 inches; seven and three-fourths inches is recommended. Treads shall not be less than 9 inches, exclusive of nosing. (Instead of 7¾ in. rise and 10 in. tread as per §217.)

240. Solid risers (as per §220) are recommended but not required.

241. Except where fire escape stairs terminate over streets, alleys or private driveways, stairs shall be built permanently to the ground as per §222. In other cases stairs may (but are not recommended to) terminate in a swinging stairway, to which the following specifications shall apply:

(*a*) Width of swinging section of stairs shall be at least equal to that of the stairs above.

(*b*) Pitch shall not be steeper than that of the stairs above.

(*c*) Railings 42 in. high shall be provided similar to those specified by §243.

(*d*) If distance from lowest platform to ground exceeds 12 ft. an intermediate balcony not more than 12 ft. from the ground nor less than 7 ft. in the clear underneath, shall be provided with width not less than that of the stairs and length not less than 4 ft.

(*e*) Counterweight shall be provided for swinging stairs, and this shall be of type balancing about a pivot, no cables being used. Counterweight shall be securely bolted in place, except that sliding ball weights or their equivalent may be used to hold stairs up and to help lower them. Counterbalancing shall be such that a weight of 150 pounds, one step from pivot will not start swinging section downward, and a weight of 150 pounds, one quarter of the length of the swinging stairs from the pivot will positively cause stairs to swing down.

(*f*) Pivot for swinging stairs shall either have a bronze bushing or have sufficient clearance to prevent sticking on account of corrosion.

(*g*) No latch to lock swinging stair section in up position shall be installed.

(*h*) Latch is suggested to hold stairs down when they have once swung to ground.

(*i*) Railings shall be designed to prevent any possibility of injury to persons at head of stairs or on balconies when stairs swing downward. Minimum clearance between moving sections where hands might be caught shall be 4 inches.

(*j*) Swinging section of stairs shall not be located over doors, over the path of travel from any other exit, nor be in any location where there are or are likely to be permanent or temporary obstructions.

Enclosures and Rails.

242. On buildings over 5 stories or 60 ft. in height, enclosures and rails shall conform to the requirements for Class A (§§225-228).

243. On buildings less than 5 stories or 60 ft. in height, enclosures may be not less than 42 in. high (instead of 5 ft.). Stair enclosures may consist of equally spaced triple railings.

244. Where enclosures are not over 42 in. high the upper member of enclosure, if of suitable construction and free from obstructions tending to break hand hold, may serve as a handrail, instead of providing a separate handrail as per §228.

Access.

245. Access to Fire Escape Stairs should preferably be in accordance with §229, but may be by doors or windows having sills above the floor, subject to the provisions of §§246-249, and otherwise in accordance with the requirements for Class A.

246. Approved doors or casement windows (except as double hung windows are permitted by §247) shall be used, swinging with the exit travel. The minimum clear width of individual openings shall be 24 in. and the minimum height 6 ft. 6 in.

247. Where specifically permitted by occupancy sections, approved, double hung, metal frame, wired glass windows may be used as a means of access to fire escape stairs, provided that

(*a*) Windows are counterbalanced and operate readily.
(*b*) Minimum clear width of lower sash is 30 in.
(*c*) Minimum clear height of lower sash is 36 in.
(*d*) Window sill is not less than 18 in. and not more than 30 in. above the floor of the room from which escape is to be made.

248. Where sills of door or window openings are over 12 in. above floor, one or more steps of equal height, shall be provided, so that top step is not less than 12 in. or more than 18 in. below sill. Steps shall be full length of window opening and not less than 9 in. wide, exclusive of nosings, and as nearly 7¾ in. high as may be practicable.

249. Where doors or casement windows give access to balconies, balcony floor level shall be in accordance with §233; where double hung windows give access to balcony, balcony level shall be not less than 7 in. nor more than 18 in. below window sill.

See §§262-270 *for additional requirements on lights, signs, and maintenance applying to Class B Fire Escape Stairs.*

Class C—Fire Escape Stairs.

Class C—Fire Escape Stairs represent a lower standard than Class B, and are the minimum permitted under any conditions as a required means of exit. These specifications should be used only in checking the construction of, or making alterations in, an existing fire escape, where it is not practicable to make the escape conform to the specifications for Class B.

Class C Fire Escape Stairs will be found to have a very small rated capacity (see §§202, 134).

250. Class C Fire Escape Stairs shall conform to the preceding requirements for Class A, as modified for Class B, subject to the following additional permitted modifications.

251. Balconies and stairs shall be sufficient to carry a load of not less than 90 lbs. per sq. ft. with a factor of safety of 4. (Instead of §210 and §211.)

252. Balcony and stair enclosures and railings shall be of substantial construction, with support at walls as specified in §213. (§212 and §214 waived.)

Stairs and Balconies.

253. Stairs shall be at least 18 in. wide between rails. (Instead of requirements of §215 or §238.)

254. The minimum horizontal dimension of any landing, platform, balcony or passageway shall be 18 in. (Instead of 22 in. as per §238.)

255. The pitch of stairs shall not exceed 60 degrees. Treads shall be not less than 6 in. wide, exclusive of nosing. (Instead of requirements of §239.)

256. Stair treads and balcony floors may be of flat bars on edge, or square bars, supported to prevent turning, with maximum spacing center to center of 1¼ in. (§218 waived.)

257. Stairs having winders shall not be rejected provided that at one foot from the narrow end of the winder the width is not less than 6 in. exclusive of nosing (§221 waived).

NOTE. Winders are heavily penalized in stair capacity rating. (See §134.)

Enclosures and Rails.

258. Enclosures shall be not less than 36 in. high (instead of requirements of §§242, 243).

259. Enclosures and railings shall be of substantial construction suitable for the purpose intended. (Detailed specifications of §§226-228 waived.)

Access.

260. Access to Class C Fire Escape Stairs shall be same as specified for Class B (§§245-249) except that balcony floor level may be flush with window sill.

Ladders for Fire Department.

261. Ladders where used shall comply with the requirements of §236 (except that distance between rails of ladders shall be not less than 12 in.) (§236 c waived), and rungs shall have diameter not less than ⅝ in. or be not less than ⅝ in. square and shall be riveted in position (§236 e waived).

Signs and Lighting.

(Applies to all classes of Fire Escape Stairs.)

262. Fire escape stairs and exit ways leading thereto shall have illumination and signs in accordance with Section 12 except that the signs shall have in addition the words "FIRE ESCAPE" in plain letters not less than 2½ in. high.

Maintenance and Painting.

(Applies to all classes of Fire Escape Stairs.)

265. Steel members shall be painted before and after erection.

266. Fire escape stairs shall be inspected at least annually, and shall be scraped and painted as often as necessary to maintain them in proper condition at all times.

267. Fire escape stairs shall be kept clear of all incumbrances.

268. Fire escape stairs shall be promptly cleaned after snow or ice has accumulated upon them.

269. No obstructions such as telephone or lighting wires shall be permitted on or near fire escape stairs. Electric light or power wires shall not be directly over or within three feet of fire escape stairs or balconies, unless such wires are enclosed in rigid conduit.

270. Particular attention should be paid to possible interference by awnings at windows or over sidewalk, and to other obstructions at or near the street level. All obstructions found shall be promptly removed.

Unit of Stairway Width.

(Applies to all classes of Fire Escape Stairs.)

271. The unit of stairway width of fire escape stairs shall be the same as that of inside stairs (see §147) except that Class C fire escape stairs 18 in. wide between handrails may be accepted as one unit of width. The percentage penalties of §134 apply to fire escape stairs.

Section 3.

RAMPS.

301. Wherever stairs are called for in other sections of this code, ramps may be substituted.

NOTE. Ramps of moderate slope are recommended in place of stairways in places where large crowds are to be accommodated.

302. One 22 inch unit of ramp width shall be considered the equivalent of one unit of stairway width.

303. Ramps shall comply with all requirements for stairways (construction, width, enclosures, rails, landings, lighting, etc.) in so far as applicable. (See Section 1.)

304. Where stairs of the several classes are specified by the occupancy sections ramps may be substituted as follows:

Class A Stairs—Class A ramp; slope not greater than 1 foot in 10 feet (10%); other features same as §§121, 124, 125.

Class B Stairs—Class B ramp; slope not greater than 1 foot in 10 feet (10%); other features same as §§127, 130.

Class C Stairs—Class C ramp; slope not greater than 1 foot in 6 feet (16 2/3%).

305. Ramps shall be surfaced with suitable non-slip material wherever surface is such as to involve danger of slipping.

306. Where ramps have slope of less than 1 ft. in 12 ft. (8 1/3%) handrails shall not be required.

307. Landings (see §122) shall not be required for Class A or B ramps.

Section 4.

HORIZONTAL EXITS.

401. A horizontal exit consists of one or more protected openings through or around a fire wall or a fire partition or of one or more bridges connecting two buildings.

NOTE. As a means of rapid and safe egress from a burning building, the use of horizontal exits is strongly recommended. Such exits afford an area of quick refuge from either side and lessen the necessity for hasty flight down stairs.

For hospitals and sanitariums having bedridden patients, horizontal exits are particularly valuable. See Section 24.

402. Horizontal exits complying with the requirements of this section may be substituted for stairways or other exits.

EXAMPLE: A department store building 130 x 210 feet (population 456 per floor) would be required by this code to have exits from the upper floors sufficient to furnish 8 units of exit width. This would ordinarily require 4, 44 inch stairways.

Assume now this building is divided by a fire wall or fire exit partition into two sections, each 130 x 105 feet, with door through the wall or partition furnishing a horizontal exit. Each section, considered separately, will require two, 2-unit exits. The horizontal exit will serve as one of the two exits required for each section, and only one stairway will be required for each section. Thus the total number of stairways required for the building will be two, as compared with four if no horizontal exit is provided.

403. Standard fire walls are recommended in connection with horizontal exits. Where fire partitions are used they shall be at least equivalent in fire-resistance to the type of stair enclosure required for the building, and in any case at least equivalent in fire-resistance to Type 3 enclosure (§144).

Egress from Area of Refuge.

404. Every fire section 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 other standard exit. (Any fire section not having a stairway shall be considered as part of an adjoining section with stairway, for purposes of determining credits.)

405. Construction and arrangement shall be such that the stairway or other exit from each possible area of refuge can not be obstructed by the same fire (or smoke therefrom) which may involve the area from which refuge is taken.

406. 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.

NOTE. This requirement is complied with 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 standard 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. Where such corridors are not normally

in use proper regulations shall be enforced to make them at all times available for emergency exit.

407. Doors used in connection with horizontal exits shall be kept unlocked and unobstructed whenever premises are occupied on either side of the exit.

408. 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 square feet net clear area per person. (See §2013A for method of determining number of occupants.)

409. Except as permitted in §417, no stairs or steps shall be used in a horizontal exit in a new building. Where there is a difference in level between connected floor areas, ramps shall be used in accordance with Section 3.

Doorways.

411. Units of width shall be determined in accordance with §504.

412. No opening serving as a horizontal exit shall be less than the minimum specified by §504 and should be preferably not more than 88 inches in width nor more than 80 square feet in area. Where greater widths are required for operating purposes, no credit shall be given for more than 4 units in width for any one opening.

413. Doors. Each opening serving as a horizontal exit shall be protected by at least one self closing swinging fire door, or automatic sliding fire door. If swinging doors are used, there shall be adjacent openings with swinging doors at each, opening in opposite directions, with signs on each side of the wall or partition 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. (See Section 5 for detailed requirements for doors.)

Bridges and Balconies.

414. The unit of width for bridges and balconies shall be 22 in. In new bridges and balconies the minimum width shall be 2 units, or 44 in. (Handrails may project into this width not more than 3½ in. on each side.) In existing bridges and balconies 42 in. may be accepted as 2 units and 34 in. as 1½ units. In no case shall bridges or balconies less than 34 in. wide be accepted.

415. Balconies. Balconies leading around fire walls or fire exit partitions shall conform to the requirements for balconies of smokeproof towers. (See §§137, 141.)

416. Bridges. Construction shall be entirely of noncombustible material and floors shall be solid. Railings shall be in accordance with the requirements for railings for balconies of fire escape stairs, §§225, 226.

417. The level of the bridge floor should be below the building floor level, by approximately 7¾ in., where the bridge is not completely enclosed and climate is such as to involve possibility of blocking doors by snow or ice; where the bridge is completely enclosed or the climate is such as not to involve this possibility, balcony should preferably be level with the floor.

418. All wall openings, in both of the connected buildings, any part of which are within 10 ft. of any bridge as measured horizontally or below shall be protected with fire doors or metal frame wired glass windows, preferably with stationary sash; provided, however, that where bridges have solid sides not less than 6 ft. in height, such protection of wall openings may be omitted.

419. Where there is a difference in level between connected buildings or floor areas ramps may be employed in accordance with Section 3.

Lighting and Signs.

420. Horizontal exits and passageways, and passageways through areas of refuge, shall have illumination and signs in accordance with Section 12.

Section 5.

DOORS.

500. All doors used in connection with exits shall be substantially constructed and installed in a workmanlike manner, and be fitted with reliable hardware.

501. All doors used in connection with exits shall swing with the exit travel except as doors sliding across the exit travel may be permitted by other sections of this code. Vertical sliding doors and rolling shutters shall not be used on exits.

NOTE. Swinging doors are preferable and should be used wherever possible.

502. Doors from individual rooms to corridors or hallways shall swing with the exit travel where (a) room is used for purpose of assembly, or (b) where room is occupied by 50 or more persons, or (c) where room contains any hazardous occupancy (§2021).

NOTE. It is recommended that where doors lead into the path of travel from other areas they be so located as not to project into such path of travel at any point during their swing.

503. All doors used in connection with exits shall be so arranged as to be always readily opened from the side from which egress is made. Locks, if provided, shall not require key to operate from the inside.

NOTE. Except as permitted by occupancy sections, doors used in connection with exits shall be kept continually unlocked in the direction of egress while buildings are occupied. Where doors are required to be kept unlocked and for operating reasons it is undesirable to allow unrestricted communication between building and outside, doors may be provided with alarms. Any devices or alarms installed to prevent the improper use of exits shall be so designed and installed that they cannot, even in case of failure, impede or prevent emergency use of such exits.

For requirements for schools see §§2131-2134; department stores §2212 and §2213; factories §2310 and §2311; for hospitals and sanitariums §2403 and §2445A; for places of public assembly §2560; hotels §2612; office buildings §2717 and §2718; apartment houses §2812.

Widths.

504. The unit of width for doorways shall be 22 inches. Door jambs shall not project into the required width of doorways by more than 2 inches for each 22 inch unit. (20 inches net opening.)

Credit for fractions of units shall not be allowed except that a credit of one half unit shall be allowed for 12 inches of clear width added to one or more 22-inch units of width.

Where a doorway is divided into two or more separate door openings, each such opening shall be measured separately in computing the number of units of exit width.

EXAMPLE: A 66 in. doorway, with two separate 30 in. door openings (6 inches allowed for stops), would be rated as one unit for each 30-inch opening, or a total of two units for the doorway.

No exit doorway shall be less than 36 inches wide, except that doorways in connection with stairways shall not be required to have a greater number of units of width than the stairway.

Where a doorway is divided into two or more separate door openings, the minimum clear width of each such opening shall be not less than 28 inches.

Doorway Widths.

(Table based on requirements of §504.)

Doorway Width (Nominal)	*Clear Opening*	*No. Units Exit Width*	*Stairs Served by Doorway*	*Remarks*
	24″	1	22″	Existing Buildings, Class B or C Outside stairs, §246.
	28″	1		Minimum individual door opening.
36″	34″	1½	36″	36″ stairs as permitted by §131.
44″	40″	2	44″	Standard for 2-unit stairway.
	52″	2½		
66″	60″	3	66″	
	2, 28 in. openings	2		
88″	2, 40 in. openings	4		
	3, 28 in. openings	3		

Fire Doors.

505. Fire doors shall be of the self closing or automatic types.

A self-closing fire door is one which is normally kept in a closed position by some mechanical device.

An automatic fire door is one which is arranged to close automatically when released by the action of heat.

506. Fire doors shall be kept free from all obstructions.

For special requirements for smoke resistive doors for schools see §§2131-2133; for hospitals and sanitariums §§2426(a), (b) and (c), 2445A. See also §512.

NOTE. Noncombustible guards are recommended to prevent stock being piled against sliding doors. With swinging doors, painting marks on the floor to indicate the path of the door during its swing, will often be helpful in preventing obstruction.

507. Fire doors shall be smoke tight and shall have a fire resistance appropriate to the wall or partition in which they are placed, in accordance with §508. (See Note page 32.)

NOTE. Better fire doors than those specified herein will usually be necessary in order to secure proper fire safety for property, and should be used where circumstances permit.

508. Fire doors in Classes 1, 2 and 3 Stairway Enclosures (§§137-144) and in fire walls and fire exit partitions of horizontal exits shall be at least Class B fire doors, as described in the Standards on the Protection of Openings in Walls and Partitions, as recommended by the National Fire Protection Association (see §14); for Class 4 Stairway Enclosures, Class C doors.

NOTE. It is especially important that fire doors, hardware and heat-release devices used in connection therewith be of approved type.

509. Fire doors shall be installed in accordance with the Standards for the Protection of Openings in Walls and Partitions against Fire, as recommended by the National Fire Protection Association, in so far as applicable.

Revolving Doors.

510. Revolving doors shall not be used on required exits except that approved collapsible revolving doors may be used between street floor (but not at foot of stairs) and street where specifically permitted by occupancy sections. Where used, revolving doors shall not constitute more than 50% of the required door width.

511. Each revolving door shall receive credit as constituting one-half unit of exit width. (See §504.) At any location the number of revolving doors constituting required exits shall not exceed the number of units of swinging door width immediately adjoining or within 20 ft.

Panic Hardware.

512. (a) The exit doors of schools, motion picture theatres and theatres of whatever capacity, shall be equipped with latches (fire exit bolts) which release when pressure of not to exceed 15 pounds is applied to the releasing devices in the direction of the exit travel. Such releasing devices may be bars or panels extending not less than two-thirds of the width of the door and placed at heights suitable for the service required,—usually not less than 30 nor more than 44 inches above the floor.

(b) The exit doors of all other places of public assembly having capacities in excess of 500 persons shall be equipped with latches (fire exit bolts) as provided in §512 (a).

Obstructions, Visibility.

515. All exit doors shall be so arranged as to be readily visible and no obstructions interfering with access or visibility shall be permitted.

516. No draperies shall be permitted over or in front of exit doors.

517. No mirrors shall be placed in exit doors.

Section 6.

AISLES AND CORRIDORS.

601. Where there is not direct access to exits, safe and continuous passageways, aisles or corridors leading directly to every exit and so arranged as to be conveniently accessible to every occupant, shall be maintained at all times on all floors of all buildings.

602. Widths of passageways, aisles or corridors shall be measured in the clear, at their narrowest points produced by any projection, radiator, pipe or other object. Doors swinging into passageways shall not restrict the effective width at any point during their swing to less than the minimum widths hereinafter specified.

NOTE: Any projection, radiator, pipe or other object that extends into a corridor, irrespective of width, is undesirable, particularly where large crowds must be accommodated.

603. The aggregate width of passageways, aisles or corridors leading to any exit shall be at least equal to the required width of the exit. Where all travel to any exit is along the passageway, such passageway shall have a width at least equal to the required width of the exit; where several passageways lead to an exit each shall have a width suitable for the travel which it may be called on to accommodate.

604. The minimum width of any passageway, aisle or corridor shall be three feet in the clear.

NOTE: For aisle and corridor requirements for schools see §2127; for department stores, §2215; factories, §2312; for hospitals and sanitariums, §2446; for places of public assembly, §§2562-2564; hotels, §2613; office buildings, §2719; apartment houses, §2813.

Section 7.

ELEVATORS.

701. Elevators are not required as exits by this code, and may not be substituted for required stairways, except as permitted by other sections of this code for fire resistive office buildings of limited area and similar low hazard occupancies where a bank of two or more passenger elevators may be substituted for one of two required stairways.

702. Where permitted as required exits, elevators are accepted on the basis that one passenger elevator is equivalent to one-third of a 22-inch unit of stairway width.

703. Elevators shall conform to the American Standard Safety Code for Elevators, Dumb Waiters and Moving Stairways (see §14), hereinafter referred to as the A.S.A. Elevator Code.

703A. A stairway or some other exit shall be accessible from every elevator entrance landing, and if such stairway or other exit is not visible signs shall be provided to indicate the direction to reach it.

704. The following additional requirements apply only to elevators which are counted as required exits.

NOTE. In most cases the occupancy sections of this code require that elevator shafts be provided with standard enclosures, whether or not the elevators constitute required means of egress.

705. All elevators shall be enclosed in standard fire resistive shafts at least equivalent in fire resistance to the required enclosure for stairs in the same building. Where more than two elevators are in a common shaft, only two may be counted for exit purposes.

706. Elevators counted as exits shall not be in a common enclosing shaft with a stairway, and the path of travel from one flight of stairs to the next shall not pass directly in front of elevator doors.

707. Elevator shaft doors shall conform to the section of this code on doors, in so far as applicable (see Section 5).

NOTE. Small clear wired glass panels are desirable for vision but shall not be used where they conflict with other requirements.

708. Access to elevators and from elevators to street shall be provided in accordance with similar requirements for Stairways. (See §§110-113.)

NOTE: This means that elevators constituting required means of egress must discharge at the street floor into a fire resistive corridor or passageway leading to the street; not into an open street floor area where egress to the street might be interfered with by fire in the street floor or basement except as otherwise permitted by occupancy sections [see §2208; §2608 (a), (b), (c), (d); and §2808 (a), (b)].

709. In all computations for elevators only those normally used for passenger service to the floor or floors under consideration shall be counted for exit purposes.

710. Elevator cars and entrances thereto shall be illuminated in accordance with Section 12. The intensity of illumination of the floors and walls of car and doorway shall not be less than one foot-candle.

Section 8.

MOVING STAIRWAYS.

Escalators—Electric Stairways—Motorstairs, Etc.

801. All moving stairways shall comply with the applicable requirements for moving stairways in the American Standard Safety Code for Elevators, Dumb Waiters and Moving Stairways, ASA Standard A-17.1-1937, A-17.3-1942, Reprint 1945.

802. In addition to manual controls required by §801, each moving stairway shall be provided with an automatic stopping device which will stop the unit simultaneously with the automatic detection of fire in the building or section of the building affected.

Moving Stairways as Required Exits.

803. Moving stairways conforming to §§801 and 802 may constitute required means of egress, subject to the limitations of the occupancy sections and to the following:

(*a*) Enclosures, arrangement and access, and doors shall comply with all requirements for stairways constituting required means of egress except that the requirements of §109 in the case of moving stairway installations may be met by providing a stairway between the top floor and the roof.

(*b*) Only moving stairways operating in the direction of exit travel shall be given credit as required means of egress. In factories and office buildings, reversible moving stairways may be accepted as required means of egress provided that a readily accessible main control panel, from which all moving stairway units in the exit group may be stopped or reversed, is located on the main floor of egress adjacent to and in the same enclosure with the moving stairways.

(*c*) Moving stairways shall be of horizontal tread type and shall be of noncombustible construction throughout except step tread surfaces, hand rails and step wheels.

NOTE: Cleat type moving stairways are not acceptable as required means of egress.

(*d*) The minimum width of moving stairways measured between the balustrading at a vertical height of 24 inches above the nose line of the treads shall not be less than 42 inches (2 units). Steps shall not be less than 35 inches in length (width between skirt boards).

(*e*) No single moving stairway flight shall have a vertical travel of more than two stories or 35 feet.

(*f*) Landings shall be provided at top and bottom of moving stairways similar to those required for stairways constituting required means of egress.

(*g*) Rated units of exit width shall be the same as required for stairways. (See §147.)

Protection of Floor Openings.

804. Floor openings for moving stairways not constituting required means of egress shall be protected, except under conditions where protection of openings is waived by the applicable occupancy section (e.g. See §2227), as follows:

(A) Floor openings shall be provided with enclosures as required for stairways or,

(B) In buildings completely protected by an automatic sprinkler system, supervised in accordance with the National Fire Protection Association Standards for Central Station Protective Signaling Systems or the National Fire Protection Association Standards for Proprietary Signaling Systems (See §14), each moving stairway floor opening shall be protected against the passage of fire, smoke and gases to the story above by one of the following alternative methods of protection:

"SPRINKLER-VENT" METHOD

1. A combination of an automatic exhaust system and an automatic water curtain meeting the following requirements and of a design meeting the approval of the inspection authority having jurisdiction:

(*a*) The exhaust system shall be of such capacity as to create a down draft, through the moving stairway floor opening, having an average velocity of not less than 300 ft. per min. under normal conditions for a period of not less than 30 minutes.

NOTE: This requirement can be met by the provision of an air intake from the outside of the building above the floor opening. The test of the system under "normal" conditions requires that the velocity of the downdraft be developed when windows or doors on the several stories normally used for ventilation are open. The size of the exhaust fan and exhaust ducts must be sufficient to meet such ventilation conditions. Experience indicates that fan capacity should be based on a rating of not less than 500 cfm per sq. ft. of moving stairway opening to obtain the 300 ft./min. required. If the building is provided with an air-conditioning system, arranged to be automatically shut down in the event of fire, the test conditions should be met with the air-conditioning system shut down. The 300 ft./min. downdraft through the opening provides for the testing of the exhaust system without requiring an expansion of air present under actual fire conditions.

(*b*) Operation of the exhaust system for any floor opening shall be initiated by an approved thermostatic device in the story involved and shall also result from the functioning of other required automatic fire detection devices within the building or section of the building. There shall also be provided a manual means of operating and testing the system.

NOTE: Supervised smoke detection devices ordinarily provide earlier detection of fire than automatic sprinkler systems and if used to actuate the exhaust system automatically should provide an added life-safety advantage.

(*c*) To assure reliability of the electrical supply to all parts of the exhaust system and its control devices the power supply lines shall be installed in accordance with the requirements of Section 202 of the NFPA Standards for Centrifugal Fire Pumps.

(*d*) Fans and ducts used in connection with automatic exhaust systems shall be constructed and installed in accordance with the Articles 220 and 230 of the NFPA Standards for the Installation of Blower and Exhaust Systems for Dust, Stock and Vapor Removal or Conveying.

(*e*) Periodic tests, not less frequently than quarterly, shall be made of the automatic exhaust system to maintain the system and the various control devices in good working condition.

(*f*) The water curtain shall be formed by open sprinklers or spray nozzles so located as to form a complete water barrier along all exposed sides of the floor opening and reaching from the ceiling to the floor.

NOTE: The Inspection Department having jurisdiction should be consulted on the use of water curtains as determined from a study of the conditions obtaining in each case. The installation standards for open sprinkler systems should be the applicable sections of the NFPA Standards for the Installation of Sprinkler Equipments. (See §14.)

(*g*) The water curtain shall operate automatically from thermal responsive elements so placed with respect to the ceiling (floor) opening that the water curtain comes into action upon the advance of heat towards the moving stairway opening.

(*h*) Automatic exhaust systems, including all motors and controls and automatic water curtain systems, shall be supervised in accordance with the NFPA Standards for Central Station Protective Signaling Systems or the NFPA Standard for Proprietary Protective Signaling Systems.

ROLLING SHUTTER METHOD

2. Each moving stairway opening above the street floor by an automatic self-closing rolling shutter which will completely enclose the top of each moving stairway, meeting the following requirements, and of a design meeting the approval of the inspection authority having jurisdiction:

(*a*) The shutter shall close off the wellway opening immediately upon the automatic detection, by an approved device, of either fire or smoke in the vicinity of the moving stairway, and, in addition, there shall be provided a manual means of operating and testing the operation of the shutter.

NOTE: The use of an automatic rolling shutter to protect moving stairway wellways between basements and street floors is not acceptable for the reason that the normal path of travel to reach a place of safety in an emergency is usually that used for access to the area. Persons seeking egress from basement areas served by moving stairways could be trapped by fully closed rolling shutters at the street floor level. Observation of rolling shutters in use indicates the likelihood that under emergency conditions, a quite different psychological reaction

by those facing its operation from upper floors than could be expected when the rolling shutter is closed above a person seeking egress from a basement. On upper floors, the operation of an automatic rolling shutter will be clearly visible to persons seeking egress and other means of egress (i.e. stairways), can be readily found and used if the requirements of the Building Exits Code are followed.

(*b*) The shutter assembly shall be capable of supporting a weight of 200 pounds applied on any one square foot of area, and not less resistant to fire or heat than 24 gauge steel.

(*c*) The shutter shall operate at a speed of not greater than 30 feet per minute and shall be equipped with a sensitive leading edge. The leading edge shall arrest the progress of the moving shutter and cause it to retract a distance of approximately 6 inches upon the application of a force not in excess of 20 pounds applied on the surface of the leading edge. The shutter, following retraction, shall continue to closure immediately.

(*d*) To assure reliability of the electrical supply to the control devices for actuation of the automatic rolling shutter, power supply lines shall be installed in accordance with the requirements of Section 202 of the NFPA Standards for Centrifugal Fire Pumps.

Spray Nozzle Method

3. A combination of an automatic smoke or fire detection system and a system of high velocity water spray nozzles meeting the following requirements and of a design meeting the approval of the inspection authority having jurisdiction:

(*a*) Spray nozzles shall be of the open type and shall have a solid conical spray pattern. The number of nozzles, discharge angles and location shall be such that the moving stairway floor opening will be completely covered by a dense spray upon the operation of the system.

(*b*) The number and size of nozzles and water supply shall be sufficient to deliver a discharge of two and one-half gallons of water per square foot per minute through the floor opening.

(*c*) Spray nozzles shall be located near the top of the wellway housing and so positioned that the center line of discharge is at an angle not less than 60° with the plane of the opening to be protected.

Note: Spray nozzles located as required will provide an effective counterdraft action preventing the passage of smoke.

(*d*) Spray nozzles shall be provided with a water supply, separate from the water supply system for automatic sprinklers, at a minimum flowing pressure of at least 25 psi. Oversize piping should be used to minimize friction loss.

Note: Higher flowing pressures are preferred because the greater velocity will provide greater counterdraft effect.

(*e*) Control valves shall be readily accessible to minimize water damage. Thermal control valves may be used, if piping is arranged and sized so that any one control valve can supply simultaneously all the spray nozzles intended for the protection of the moving stairway floor opening.

(*f*) A noncombustible draft curtain, extending 20 to 30 inches below and around the opening and a solid noncombustible wellway housing above the floor shall be provided at each moving stairway floor opening. Spray nozzles shall be protected by sheet metal deflectors against mechanical injury.

(*g*) Means of manual operation of the spray nozzle system for any floor opening shall be provided and the system shall also be actuated by approved smoke detection or thermostatic devices in the story in which fire may occur.

NOTE: Supervised smoke detection devices located in or near the moving stairway floor opening may be used to meet this requirement. Thermostatic fire detection devices, such as rate-of-rise or fixed temperature systems, used to initiate the operation of the spray nozzle system should be so located as to assure the operation of the system in advance of the passage of smoke through the moving stairway floor opening.

(*h*) Control valves for the spray nozzle system, and approved smoke detection or thermostatic devices shall be supervised in accordance with the NFPA Standards for Central Station Protective Signaling Systems or the NFPA Standards for Proprietary Protective Signaling Systems.

Lighting and Signs.

805. Moving stairways shall be provided with lighting system in accordance with Section 12.

806. Directional signs for required means of egress provided in accordance with the requirement of Section 12 shall be clearly visible from the landings of moving stairways.

Section 9.

SLIDE ESCAPES.
(Spiral and Straight Chutes.)

901. Chutes are classified as special types of Fire Escape Stairs (see Section 2) and may be used only under conditions under which fire escape stairs would be permitted. Closed chutes are to be considered as Class "B" fire escape stairs and open chutes as Class "C" fire escape stairs. Chutes not conforming to these specifications shall not receive credit as required means of egress.

NOTE. Slide escapes, like any other type of fire escape, are at best an expedient permissible only for increasing the exit capacity of an existing building. This or any other type of escape is not a substitute for fire-resistive construction, for automatic sprinkler protection, or for other features which are necessary to human safety in various classes of buildings.

902. OCCUPANCIES WHERE PERMITTED. Slide escapes shall be used only where specifically permitted by the occupancy section applying.

903. NOTE. Occupancy sections thus far developed (1949) permit the use of this type of escape as follows: In new and existing industrial buildings housing high hazard occupancies (e. g. manufacture of explosives, grain elevators, etc.). In existing school buildings, orphan asylums, hospitals, sanitariums and corrective institutions.

904. LIMITATIONS OF HEIGHT. Except in buildings where there are relatively few occupants or where permitted by specific occupancy egress codes, chutes may not constitute a required means of exit in buildings exceeding 70 ft. or six stories in height. (For definition of height see §39.)

905. LIMITATION OF CAPACITY. Chutes shall not constitute more than twenty-five per cent of the required means of egress (stairways, etc.) for any building except as this percentage may be modified for specific occupancies and conditions by the occupancy sections.

Specifications.

906. These specifications cover spiral and straight chutes attached to buildings or erected independently of them, but connected by bridges. Types in common use are:

(*a*) Vertical spiral enclosed chutes.
(*b*) Vertical spiral open chutes.
(*c*) Enclosed straight chutes parallel to or at right angles to buildings.
(*d*) Open straight chutes parallel to or at right angles to buildings.

Design.

907. For all chutes the slope shall be not less than 24 degrees and not more than 42 degrees with the horizontal. On spiral chutes the slope shall be measured by developing the spiral line on the cylindrical section two feet from the inner edge.

NOTE. Where hospital pads are to be used steeper pitches are recommended provided, however, that in no case shall the pitch exceed 42 degrees.

908. On all straight chutes having slopes greater than 30 degrees there shall be a section at the lower end at least 10 feet long, set at an angle not to exceed 15 degrees with the horizontal, connected with the upper section by a curved compensating section.

909. On spiral chutes, transition from one pitch interval to another where necessary on account of differing story heights shall be made by the use of compensating plates so that there is no perceptible interruption of the slide.

910. Spiral chutes shall be not less than 28 inches nor more than 42 inches wide. Straight chutes shall be not less than 24 inches nor more than 42 inches wide.

NOTE. Where hospital pads are to be used the clear width should be not less than 34 inches and not more than 42 inches for both spiral and straight chutes.

911. The slideways of spiral chutes shall be banked from a point 12 inches from the outer edge to a point 5 inches above the level of the center of the chute.

912. The horizontal distance between vertical supports for straight chutes shall not exceed 10 feet. Spiral chutes shall be braced to the building at each entrance floor and at other points if necessary so that the braces will not be more than 10 ft. apart.

913. On enclosed chutes, doors shall be provided at each entrance, swinging with the exit travel, so constructed that they will not obstruct the use of the chute; the door openings shall be at least 30 inches wide and at least 6 feet 6 inches high. Where entrance is direct from the building with no intervening landing or balcony, access openings may be not less than 42 inches high.

Location and Arrangement.

914. Chutes installed inside buildings shall conform to all requirements for enclosure of stairways (see Section 1).

915. Chutes installed outside buildings shall be protected from fire within the building to which they are attached by one of the following methods. The order indicates the desirability of protection:

(*a*) Noncombustible and enclosed chutes affording protection against weather, smoke or fire and with access direct or through covered balconies at vestibules.

(*b*) Chutes entirely shielded by blank walls, access from wall openings to chutes being by horizontal balconies.

(*c*) Chutes shielded by approved *stationary* metal frame, windows glazed with wired glass, and balconies extending in one or both directions to openings protected with approved doors or wired glass windows in a manner similar to that required for the protection of Fire Escape Stairs (see §§234, 235).

916. In all new installations where constituting a required means of egress, spiral chutes shall extend to the roof.

917. In existing installations of spiral chutes on fire resistive buildings chutes shall extend to the roof.

918. The lower edge of the chute at the discharge point shall be at least 12 in. and not more than 20 in. above the ground or walkway level. Where hospital pads are to be used on a chute, the lower end shall terminate in a straight, level discharge table at least 15 feet in length, so arranged as to allow access to both sides.

919. On enclosed chutes in locations where snow or ice may obstruct the discharge point, a shed shall be provided, made of noncombustible materials, having a clear height of not less than 7 feet, with roof not less than 8 feet wide and not less than 8 feet long, connected with the enclosure of the chute by metal flashing. Where discharge tables are installed the roof shall extend at least 4 feet beyond the end of the table.

920. No doors shall be allowed at bottom or discharge point of chute.

921. All chutes shall lead directly to the street, to a yard or court connected with the street, or to a fire-resistive passage leading to the street. Such fire-resistive passage shall be at least 44 in. wide, shall be unpierced and shall be not less than 8 feet in height for new buildings and 7 feet in height for existing buildings. Where chutes discharge, the adjacent exposing wall openings, if any, shall be protected in a standard manner to provide for safety of egress.

922. On open spiral chutes the minimum height of outer side shall be 36 inches above the lowest point of the adjacent slideway in the same radial vertical plane, except at entrances. On open straight chutes the minimum height of both sides shall be 24 inches above the lowest point of the slideway (measured vertically), and in all cases shall be as high as the width of the slideway.

923. On straight chutes the entrance landing shall be flush with the lowest point in the adjoining surface of the slideway. On spiral chutes the center of the entrance landing shall be not less than 12 inches nor more than 18 inches above the lowest point in the adjacent slideway in the same radial vertical plane.

Materials and Strength.

924. Iron, steel, or concrete shall be used where structural strength is required; elsewhere other noncombustible materials may also be used. No wood shall be employed. (See also §929.)

925. Balconies shall be designed to carry a live load of 100 lbs. per sq. ft., with a factor of safety of 6 (see also §928).

NOTE. This factor of safety is larger than ordinary practice, and is recommended because balconies are unusually subject to weakening through corrosion.

926. All supporting members for balconies and chutes, 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. Where metal members pass through walls, they shall be protected effectively against corrosion.

927. Balcony and chute enclosures and railings shall be designed to withstand a horizontal pressure of 50 lbs. (with factor of safety of 6) per running foot of railing or enclosure without serious deflection, and support at walls for balcony railings or enclosures shall be in manner specified in §926 for tension members.

928. The chutes and their supports shall be designed to carry the weight of the structure itself and 100 lbs. per lineal foot of slide (as measured at the middle of the slideway) with a factor of safety of 6.

929. Slideways shall be made of galvanized steel with joints lapping over in the direction of descending load or with edges of adjoining sec-

tions flanged so as to form a flush joint; all rivets, bolts, etc., to be flat-headed, countersunk, and protected by solder.

Access to Chutes.

930. NEW BUILDINGS. Access shall be through doorways flush with the floor. Only approved forms of doors may be used.

931. Doors, or approved casement windows swinging with the exit travel, shall be used, provided that:

(*a*) Minimum clear width is 30 inches when open.

(*b*) Minimum height of door opening is 6 feet 6 inches except as provided in §913.

932. Doors and casement windows shall conform to §231.

933. Where doors or casement windows lead to outside balconies, the level of the balcony floor should be below the sill level in accordance with §141.

934. EXISTING BUILDINGS. Access should preferably be in accordance with §§930-933, but may be accepted if conforming to §§245-249.

NOTE: Where hospital pads are to be used it is recommended that each chute should serve only one floor of a building.

Obstructions in Openings.

935. No gratings or other obstructions, shall be placed at or over any exit opening, except in hospital and sanitarium buildings as permitted by §2403; provided, however, that fly screens may be installed when essential if they are free from heavy cross members and are arranged to open out in a manner which will not interfere with exit travel and are not held closed other than by a spring or a simple, readily operated latch.

Capacity.

936. One chute conforming to these specifications shall be considered as constituting two units of exit width. (e.g. one chute is equivalent in capacity to an outside stairway 44 in. wide.)

Signs and Lighting.

937. Straight or spiral chutes and passageways thereto shall have illumination and signs in accordance with Section 12. This shall not be understood as requiring lights within chutes. Signs directing the way and at the entrances to such chutes shall have in addition to the words specified in Section 12 the words "STRAIGHT CHUTE" or "SPIRAL CHUTE" as the case may require in letters not less than 2½ inches high.

Section 10.

ALARM SYSTEMS.

1000. Manually operated fire alarm equipment in accordance with the following specifications, shall be provided in all buildings where required by the several occupancy sections.

If a building is divided by one or more fire walls, each section shall be considered a separate building in applying the foregoing requirements.

1001. This code does not provide details of construction and arrangement of alarm systems, nor do its requirements extend beyond those necessary for safeguarding occupants from fire and fire-panic hazards.

NOTE: The installation of alarm systems in accordance with this code will serve to decrease the fire hazard to property. It is strongly recommended that alarm systems be installed so that in addition to complying with the requirements of this code, they will also comply with the Standards of the National Fire Protection Association for the "Installation, Maintenance and Use of Central Station Protective Signaling Systems for Watchman, Fire Alarm and Supervisory Service," and for the "Installation, Maintenance and Use of Proprietary, Auxiliary and Local Systems for Watchman, Fire Alarm and Supervisory Service" thus affording greater protection to property.

Electrical notification systems are preferable to mechanical notification systems where conditions are such as to require more than one sending station and, usually, where more than one sounding device is required. Mechanical systems are used where but one station is required, particularly where it would be difficult to secure regular and responsible maintenance of an electrical system.

1002. Systems shall be under the supervision of a responsible person who shall cause proper tests to be made at frequent intervals and have general charge of all alterations and additions.

NOTE: No type of signaling equipment is sufficiently automatic or durable to avoid the necessity for periodical inspections and working tests of all its parts. Especial importance is placed upon the efficiency and reliability and the methods employed in maintaining and in inspecting alarm systems.

1003. Systems shall be tested at not less than weekly intervals, subject to the provisions of the occupancy sections applying. (§§2144, 2316, 2461, 2576, 2616, 2722, 2816.)

1004. 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 re-winding or replenishing shall be rewound or replenished as promptly as possible after each test or alarm.

SOUNDING DEVICES:

1005. Required sounding devices shall be used for fire alarm purposes only.

1006. Alarm sounding devices shall be provided of such character and so distributed as to be effectively heard in every room above all other sounds, where specified by occupancy sections. Visible alarm devices may be used in lieu of audible devices only where specifically permitted by occupancy sections. (See §§1153, 2461, 2576.)

NOTE: Visible alarm devices in addition to audible alarms are desirable in buildings occupied by deaf persons.

1007. Alarm sounding devices shall be distinctive in pitch and quality from all other sounding devices.

1008. All manually operated sending stations and alarm sounding devices in a single system should be of the same type.

NOTE: The manner of sounding alarms should be standardized with a view of obtaining uniformity throughout as large a geographical area as practicable, so that persons moving from one locality to another will not be misled and confused by differences in manner of sounding alarms.

This point is of special importance in certain occupancies. For example, pending the time when state-wide uniformity in school alarm systems can be attained, uniformity of alarm signals should be strictly enforced in all public and private schools throughout each city and the adjacent suburban territory.

ALARM SENDING STATIONS:

1010. Manually operated sending stations shall be provided near all main exits and in the natural path of escape from fire, at readily accessible and visible points which are not likely to be obstructed.

1011. Sending stations shall be so located that from any part of the building not more than 200 feet will have to be traversed in order to reach a sending station on the same floor, or 100 feet and one flight of stairs to reach a sending station upon another floor located in the natural path of escape from fire. Such stations shall have illumination as required for principal point of exit ways, §1202.

NOTE: It is recommended that at least one sending station be provided upon each floor. Where conditions are such as to require but one sounding device for an entire building, the functions of a sounding device and a sending station may be combined in a single mechanism.

1012. The arrangement of sending stations, and the manner of their connection with sounding devices shall be such that there will be no difference between the sounding of actual alarms and drill signals. (See also §1017.)

NOTE: The manner of operation of manually operated sending stations should be standardized so that persons moving from one locality to another will not be confused by differences.

SUPERVISORY CONTROL OF ALARMS:

1013. Systems shall be so arranged that no manual intervention will be required, following the actuation of a sending station, for causing effective response of all required sounding devices. No facilities shall be provided whereby such response can be controlled or modified except where otherwise specifically permitted by an occupancy section.

AUTOMATIC FIRE DETECTION SYSTEMS—AUTOMATIC SPRINKLER SYSTEMS:

1014. Connections may be provided between required manually operated alarm systems and automatic fire detection systems or automatic sprinkler systems, provided that the effectiveness and dependability of operation of the alarms from manual sending stations is not thereby impaired, and that §1010 is fully complied with.

INCIDENTAL FUNCTIONS:

1016: Manually or automatically operated fire alarm systems may be arranged for the accomplishment of incidental functions such as the release of self-opening or self-closing doors, cutting off supplies of gas, fuel-oil or electric power, switching on emergency lights, the stopping of air supply ventilating fans, and the like, in so far as the accomplishment of such incidental functions does not in any way impair the effectiveness or reliability of the required sounding devices in response to the required sending stations.

CODE SIGNALS:

1017. Code signals indicating where the alarm originates should be used only where permitted by occupancy sections. (See §§2219, 2316, 2461, 2576.)

NOTE: It is often advisable to give code signals to those in authority and those who will assist the occupants in leaving the building—as, for example, to principals, superintendents, managers, engineers, members of private fire brigades, etc., who require drills in the interpretation and response to code signals. (See §1153.)

CONNECTIONS TO MUNICIPAL DEPARTMENTS:

1018. Fire alarm equipment installed as required by occupancy sections for the notification of the occupants of buildings in localities under protection of regularly organized fire departments or private fire brigades should be arranged to cause automatic transmission of alarms (directly or through an approved central office) to such fire departments or brigades upon operation of any alarm sending station. When no such connection is provided, it is recommended that a fire alarm box arranged to signal the fire department be installed either at the main entrance to the building; at the telephone switchboard or outside the building plainly visible by day or night and conveniently accessible from the main entrance.

1019. Automatic fire department connections (§1018) shall be so arranged as to permit drills to be conducted by those in authority without calling out the fire department, and so that the actuation of any required alarm sending station will surely call such department.

Section 11

FIRE EXIT DRILLS

Introduction.

1101. 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.

NOTE: The term "fire exit drill" is used to avoid confusion between drills held for the purpose of rapid evacuation of buildings as described in this section, 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.

1102. Drills should be held frequently to be effective.

1103. Fire is always unexpected. Drills should be so arranged that they will ensure orderly exit under the unusual conditions obtaining in case of fire. For this reason drills should be habitually held in unexpected ways and at unexpected times. 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 fire escape stairs, and other emergency exits that are not habitually used during the normal occupancy of the building.

1104. In order to secure proper order and control it is essential that the plan and conduct of the drill be in the hands of responsible persons competent to exercise leadership, who have been carefully schooled in what to do in case of fire emergency.

1105. Satisfactory fire exit drills depend upon some suitable fire alarm system, which should be in accordance with Section 10. The fire alarm should be regularly used as the signal to start the fire exit drill.

1106. Fire fighting should always be made secondary to life safety. Where there is a regularly organized private fire brigade instructions should be given to defer any fire fighting operations that might interfere with prompt and orderly exit until after buildings are vacated. Especial emphasis should be laid on not obstructing lines of exit by means of fire hose laid across stairways, and not blocking open protecting fire doors by hose lines, until all occupants are out of danger.

1107. 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 population 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.

1108. In buildings where the population 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 properly direct 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.

1109. The following suggested Exit Drill plan (§1110) describes an organization and procedure suitable for a large industrial establishment. This plan may be modified to suit other occupancies and smaller buildings.

A suggested plan for fire exit drills in hospitals, sanitariums, and corrective institutions will be found beginning at §1150, and for fire exit drills in schools, §1170. Drills in other occupancies not specifically covered may be organized in accordance with the general principles herein given.

A plan for the emergency organization of hotel employees appears in §§2651-2653.

Suggested

EXIT DRILL CODE

FOR INDUSTRIAL ESTABLISHMENTS.

1110. Exit drills are intended for the protection and safety of the occupants of buildings, and in order to make them effective every person taking part must realize his or her own responsibility and assist in conducting them in an orderly manner.

Exit drills shall be conducted once in every calendar month and all occupants shall participate therein, unless otherwise specified in the occupancy sections of this code.

Organization.

1111. Every establishment shall appoint, train and maintain the following organization for the purpose of conducting exit drills:

Chief of Exit Drill	Searchers
Floor Chiefs	Monitors
Room Captains	Inspector
Exit Guards	

Where two or more establishments jointly occupy a building wherein exit drills are required, the several establishments shall confer together and select two employees who shall be designated as chief of exit drill and assistant chief of exit drill respectively. They shall have the same duties as provided for those officers in establishments which are sole occupants of a building. Each particular establishment within such a building shall appoint their own floor chiefs and room captains, etc., whose duties shall be the same as provided for those positions in establishments which are sole occupants of a building.

Duties.

1112. CHIEF OF EXIT DRILL. He will have general charge of all matters pertaining to exit drills and organization; fix the time for holding drills; enforce disciplinary measures for failure on the part of occupants to observe rules or requirements; see that overcrowding in rooms or elsewhere is prevented and that sufficient space is given to aisles and passageways to permit quick access to all of the exits. He shall supervise the building alarm system. (§1002)

(*a*) He shall prepare and have conspicuously posted on each floor of each building a notice of the schedule of evacuation and the duties of occupants in case of an alarm.

(*b*) He shall make a survey of the building to determine the capacity of all exit facilities in accordance with the requirements of this Code.

(*c*) He shall make a census of the regular occupants of the building and estimate the maximum number of visitors by rooms and floors in order to determine whether the required means of egress are adequate.

(*d*) If the results of the survey and census show that the egress facilities are inadequate he shall advise the proper authorities of such discrepancy and indicate measures which would bring them up to the standards of this Code.

(*e*) He shall assign at least two exits for the occupants of each room in accordance with facts developed in the survey and the results of actual tests of exit time required. One of these should be the regular entrance.

(*f*) If possible, one or more exits should be reserved as entrances for firemen.

(*g*) He shall assign elevators to certain floors depending upon the building alarm signal given.

(*h*) When changes are made in the occupancy conditions he shall make such changes in the assignment of exits as may be necessary.

(*i*) He will notify all members of the exit drill organization regarding the general plan of exit assignment and the details pertinent to their specific duties, and examine them orally as to their familiarity therewith, going over the ground when necessary.

(*j*) He shall be responsible for planning the shutting off of electricity, power, gas, oil, etc., in case of alarm or fire.

NOTE. This position is differentiated from that of Chief of Fire Brigade, as the duties of the two officers have opposite purposes; one conducts persons away from the scene of a fire, while the other assembles men and apparatus to fight fire.

1113. FLOOR CHIEF. He shall have immediate charge of all occupants on his floor in all matters pertaining to exit drills. He shall be responsible for the enforcement of rules and will report infractions to the chief of exit drill.

(*a*) He shall personally supervise the sounding of the general building alarm on his floor, and see that each movement corresponding to alarm signal is promptly and properly executed.

(*b*) He shall be responsible for the condition of all aisles and passageways, and shall see that chairs, benches and stock in transit are promptly removed to insure unobstructed passageways.

(*c*) He shall select and designate the exits to be used by the occupants on his floor.

NOTE. It is required that he instruct the occupants in the use of all means of egress so that they will be familiar with all routes.

1114. ROOM CAPTAINS: Whenever floors are subdivided into two or more rooms there shall be room captains in each room who will see that each movement corresponding to the alarm signal is promptly executed. He will report to and obey the floor captain on his floor.

NOTE. Assistants should be designated for each of these positions capable of assuming the full duties thereof and in sufficient number to insure adequate supervision of exit drills in all parts of buildings. In large rooms it is advisable to have an Assistant Room Captain for every 50 occupants.

1115. EXIT GUARDS: Guards are subject to the orders of the floor chief or room captains. They shall see that the march from the rooms and in stairways is orderly, without crowding and at uniform speed, with careful observance of spacing between files; they shall be especially watchful to prevent stumbling, trampling or conditions which would require halting of exit march.

(*a*) Guards shall be stationed as follows: (1) One guard on the room side of exit door who shall see that it is opened promptly after the first signal and is kept open until all the occupants have left the room and then that it be closed; (2) at horizontal exit doors, in corridors and on stairway landings or turns. Guards will follow in the rear of the exit column and assist stragglers.

1116. SEARCHERS: There should be at least one man and one woman searcher on each floor. Upon sounding of building alarm they shall visit the toilet rooms and any rooms used and frequented by their sex in which there may be occupants who cannot hear the signal. They shall look out for any people who may become hysterical and faint. They shall leave the floor as soon as possible after the last squad leaves.

1117. MONITORS: Monitors shall have charge of squads of occupants, not to exceed 30 in any one squad; they shall see that the members of their squad quickly form in line, two abreast; they shall cause visitors in their territory to fall in with their squads. Monitors shall march at the head of their squads to the room exit assigned and then lead the march through corridors and stairways as directed by the exit guards.

(*a*) When directed to the sidewalk, monitors shall preserve squad formations and lead them a safe distance away from the building.

(*b*) When the proper signal is given, they shall return to their respective floors at the head of their squads.

(*c*) Monitors shall see that those in their charge conduct themselves in an orderly manner. They shall see that aisles and passageways are cleared of obstructions.

1118. INSPECTOR: He shall report to and obey the chief of exit drill. He shall examine each morning the condition of all doors, stairways, fire escapes and roof exits, if any, and report immediately to the chief of exit drill any obstructions or other unusual conditions. He shall test the building fire alarm system. (See par. 1003.)

1119. SUBSTITUTES: There shall be a substitute assigned to cover every position in the exit drill formation except the position of exit guards, for which there shall be one substitute for every two persons regularly assigned.

Selection of Personnel.

1120. The chief of exit drill should be some one whose position commands respect and insures compliance with all orders and instructions relating to exit drills. Previous fire department or military experience is desirable.

(*a*) Floor chiefs should be men or women in responsible positions who have the trust and confidence of their associates, are self-possessed and capable of speaking the language of the occupants on their floors.

(*b*) Room captains should possess qualifications similar to those of floor chiefs.

(*c*) Exit Guards should be strong men, alert, cool headed and capable of acting quickly in emergencies.

(*d*) Searchers should be strong, cool headed men and women.

(*e*) Monitors should be selected from among the occupants for their fitness as leaders and disciplinarians.

(*f*) Inspectors should be active men, preferably those who have had fire department experience. In large establishments they should be uniformed.

Drill Exercises.

1121. The course of action to be followed by any person discovering fire shall be to—

1. Warn others who are or may become endangered, utilizing the available alarm system or such other means as may be at their disposal.

2. Notify public fire department or regularly organized fire brigade using manual alarm box if available.

3. Proceed in accordance with assigned duties in evacuation of occupants or use of fire fighting equipment.

NOTE: For obvious reasons, drill exercises should follow the same routine, although sounding of public fire alarm may be simulated instead of actual. In large establishments where the discharging of crowds upon the sidewalks might cause uninformed persons to turn in an alarm, under the impression that there was actual fire, arrangements should be made to notify the local department regarding the time and place of exit drills.

1122. It is advisable that the alarms announcing drills should originate on different floors in order to afford practice in changing the order of procedure for possession of stairways; excepting that drill evolutions may be so arranged as to take advantage of the additional time required for the descent of those from the upper floors by dismissing such of the lower floors as would not delay the egress of the former.

1123. The marching speed should not exceed 130 steps per minute, without running.

Signals.

1124. FIRE ALARM (see §1017): The alarm will sound simultaneously throughout each building and may be so designed that it will indicate the general locality of the fire.

(a) DRILL GONGS OR BELLS: These gongs or bells shall be hand operated on each floor by the floor chiefs or in each room by the room captains; signals consisting of single taps being employed to regulate exit drill movements.

(b) ARM SIGNALS: These will be used to regulate line movements.

1. FORWARD—Raise the right arm vertically above the head;
2. MARCH—Lower in the direction to be followed by the line.
3. HALT—Extend both arms horizontally across the line of march, holding this position until signal is obeyed.
4. REVERSE—Raise right arm vertically, moving the forearm in circular motion, and lower in the direction to be followed by the line.

(c) Upon the first stroke of the alarm for a given building, occupants will immediately cease work and as far as possible shut off power to machines and gas or other open flames, close doors and windows which are not to be used as exits. Thereafter each succeeding movement will be announced by single strokes on smaller bells or drill gongs sounded by the floor chief or room captain.

(d) First Stroke of the Drill Gong: Each occupant will remove any stock, chairs or benches nearest him in the aisles, placing same either under or on top of the work table, machine or desk.

(e) Second Stroke: Squads will form double lines facing the exit to be used, each couple joining hands and monitors will take positions at ends of lines nearest exit.

(f) Third Stroke: Signal for lines to move with their respective monitors to the door of exit passage. Each file will move forward, observing a one-pace interval on the level and allowing one clear stair tread between files on stairways. The subsequent line movements will be controlled by arm signals of either the room captain or floor chief. After leaving room, movement will be directed by arm signals of exit guards.

Elevators.

1125. Elevators should be reserved for the use of the aged and decrepit who shall be conducted thereto by exit guards.

Upon the first sound of the building alarm elevator attendants shall discharge their passengers at the street level and take their cars to the floor indicated or previously assigned and hold themselves subject to the orders of the floor chief.

Power Plant.

1126. Upon the first sound of the building alarm the power plant engineer shall shut off power to machines and shafting throughout the building, excepting in cases where it would affect the operation of the fire pumps, elevators or lighting system.

Posting of Notice.

1127. The following is a recommended form of notice to be posted in establishments and read by or to each new occupant:

EXIT DRILL INSTRUCTIONS.

Exit drills are intended for the safety of all occupants of this building and each employee should assist in successfully conducting the drills, realizing that their safety and that of the visiting public is greatly increased thereby. The stronger should assist and encourage the less vigorous or more timid.

Organization.

The Chief of Exit Drills is in immediate command when fire alarm signals sound.

Floor Captains are in direct control of each floor and their instructions should be carefully obeyed.

Floor Captains will designate when and by what exit you are to leave the building. Wait until you receive his command to march.

Follow your monitors.

In the Event of Fire.

Notify others in the building of the danger by the quickest method available.

Immediately send in alarm by operating nearest interior fire alarm box.

Telephone without delay fire headquarters and send in alarm from auxiliary box, or nearest city fire alarm box.

When Alarm Apparatus Sounds in Workroom.

Operatives must:

Stop work.

Shut off power.

Stop machines.

Shut off gas and other open flames.

Close doors and windows opening upon or under fire escapes (excepting those to be used as exits).

Put chairs, stools and other obstructions on top of or under benches to clear the passageway.

Form line promptly with front of column facing the usual egress aisle and wait word of command or signal from Floor Captain.

At Command of March.

March in rapid, orderly manner from building, two abreast as instructed, not crowding upon the couple immediately in front of you, following your monitor.

Preserve the interval in line between yourself and couple in front of you.

Retain formation until dismissed or the line is returned to building.

Women and children always have the right of way.

DON'T

Don't run.

Don't lag behind, breaking up columns.

Don't scream or make unnecessary noise.

Don't laugh or talk.

Don't cause confusion.

Don't remain in toilet or dressing room.

Don't return for your clothing.

Don't try to use elevators.

Don't attempt to leave place in line until you return to the building.

Don't attempt to leave building except in accordance with exit drill regulations.

Don't fail to assist in carrying out instructions.

All exit doors must be kept unbolted and unlocked during working hours.

SUGGESTED

FIRE EXIT DRILLS FOR HOSPITALS, SANITARIUMS, and CORRECTIVE INSTITUTIONS.

(See also Section 24)

1150. As outlined in §2401 and §2402, safety to life in buildings housing sick, infirm and restrained patients is predicated upon fire-safe construction, fire prevention and protection, adequate and competent personnel, and proper exits.

NOTE: Such occupancies comprise, in large part, varied degrees of physical disability, and removal to the outside, or even disturbance by moving is inexpedient or impractical in many cases, except as a last resort. Similarly, recognizing the operating necessity for restraint of the insane and incorrigible (oftentimes 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 practised in other occupancies cannot be conducted in hospitals and institution. Fundamentally, superior construction, early discovery and extinguishment of incipient fires, prompt notification, must be relied upon to reduce the occasion for evacuation of buildings of this class to a minimum.

Penal and corrective institutions housing those able to walk do not come within the scope of the Hospital fire drill. For them, discipline is such that habitual control of the occupancy admits of excellent exit drills along the lines recommended in other sections for industrial establishments or schools. Reformatories and asylums should employ a combination of the two drills, depending upon the age of the occupants and the proportions of manual and educational training. All infirmary sections, sick bays, maternity wards, etc., of such institutions should, however, conform to the drill code for hospitals.

1151. Overcrowding in such buildings has a direct bearing on the probability of fire as a hazard to life. Similarly, insufficiency of employees and of attendant supervision decreases the possibility of discovery of fire and transmission of alarm, contributes to panic, and precludes the orderly conduct of fire drills.

1152. The practice of leaving an entire building in the hands of a single member of the staff and a few attendants or nurses is deplored. Leave of absence and "off duty" are not recognized as arguments for the diminution of attendant corps, as commonly practised. Peculiarly enough, overcrowding and lack of attendants are often contemporary. In a crisis, this combination may disorganize the best laid plans for fire and exit drills.

Signals. (See also Sections 10 and 24.)

1153. Fire drills in hospitals and sanitariums should 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 should be conducted at irregular intervals, during daytime and nighttime periods of operation, to familiarize hospital personnel (nurses, internes, maintenance engineers, and administrative staff) with coded transmission of signals, location and use of first aid fire appliances, and emergency action required under varied conditions and locations in the building.

NOTE: Many hospitals conduct successful fire 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 fire drill.

1154. Hospitals should be patrolled at regular intervals, the person charged with this responsibility visiting all parts of the premises including closets, attics, etc. for the purpose of discovering fire in its incipiency.

Fire Marshal in Charge of Drills.

1155. The marshal or institution fire chief in charge of fire drill procedure should be a fireman of experience, possessed of those qualifications demanding respect and attention, and capable of performing his diverse duties with alacrity and intelligence.

NOTE: Depending somewhat upon the character of buildings, their size and the type of patients housed, the importance of this position should not be underestimated. An ardent and conscientious fire fighter, receiving the cooperation of the staff in his work, adds materially to the safety of the occupants.

1156. DUTIES OF THE FIRE MARSHAL.

(a) He shall be responsible for the location and sufficiency of first aid fire-fighting appliances, and, by regular inspection, shall supervise their repair and maintenance. He shall instruct all employees, including the staff, in the actual handling of extinguishers and in the actual extinguishment of prepared bonfires to acquaint the personnel with their proper use, and to discourage any misgivings concerning handling such appliances.

(b) He shall, by instruction and direction, educate all employees in the purpose and use of the fire alarm system and in the fire drill (and exit drill, if any) in response to alarms.

(c) The method of handling hose lines from interior standpipes should be demonstrated to and practised by all male employees in the separate buildings, and, where chemical tanks or carts are employed, their proper use and handling should be explained and drilled. In cases where water casks and buckets may serve to advantage, bucket brigade drills should be practised.

NOTE: The extent of free brigade practice and drill, and the locations for its performance should not interfere with essential hospital routine. The superintendent should carefully study and consider this problem in cooperation with the fire marshal. Unless otherwise specifically designated, the methods of fire-fighting shall conform to the recommendations of the National Fire Protection Association for Private Fire Brigades.

(d) The fire marshal shall make regular inspections of attics, basements, wards, closets and storage spaces, with power to order the removal of unnecessary accumulations of combustibles and to remove all egress obstructions and fire hazards, both structural and operative.

(e) The fire marshal shall note all repairs necessary to fire doors, exit doors, ramps, stairs and other means of egress. Cooperating with the engineer, he shall check up and maintain adequate water supply to sprinkler systems, standpipes, etc., recording for repair all leaks and deficiencies coming to his attention.

Exit Drills.

NOTE: Attention is called to the requirements of §2431 to §2449 of the Section on Hospitals, which recommends and in some cases requires facilities for egress in a lateral direction. (See also §1150.)

1157. Due to the generally low ratio of attendants to patients and to the inability to hold regularly practised drills as in other occupancies, no regular or constant designation of those responding to fire alarm can be made. All employees should be schooled in the duties of members of the fire brigade in extinguishment of fire, as monitors to direct walking patients, and as guards for attention to bed patients. The relatively large turnover of employees in this class of occupancy accentuates the importance of constant and regular attention to preparedness in fire prevention and protection.

1158. 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.

Procedure in Case of Fire.

1159. The following practice is recommended wherever practicable. Modification of the plan or portions thereof may be necessitated by local conditions. The plan is intended to be applicable to any and all employees. It should be noted that the best laid plans for fire drills in existing buildings of substandard or unsuitable construction cannot be expected to ameliorate deficiencies of construction contributing to fire probability, or the opportunity for fire spread.

1160. Discovery of Fire.

(a) The person discovering a fire shall immediately send an alarm from the nearest fire alarm box with the least disturbance and commotion and shall see that all doors adjacent to the fire are closed.

(b) He shall advise another employee of location of fire, who in turn shall confirm the original alarm to the main office, and who shall join the discoverer near the fire.

(c) The discoverer shall immediately return to the scene of fire, if possible, and attempt to extinguish it with first aid appliances available.

Fire Brigade.

1161. Those first responding to the fire, together with the alarmists, constitute the first fire defense. They shall strive to extinguish the blaze with the least confusion and annoyance to adjacent sections. Instructions should be "Keep Your Head and do Not Quit, even though unsuccessful, but endeavor to check spread until arrival of the fire department."

Monitors.

1162. The next arrivals, other than actually engaged in fire fighting, and simultaneously with that work, constitute monitors pro tem. They shall open horizontal exit doors to adjacent sections away from the fire, and conduct ambulant patients immediately thereto. Certain of these monitors shall remain with their charges, in readiness to conduct them still farther distant from the source of danger. Any surplus monitors shall return to check up delinquents and serve as guards in the involved section.

Note. Monitors shall be provided with the necessary keys to operate all locks on detention room and wards, ward exits and other egress doors.

Guards.

1163. Other arrivals at the fire are guards whose duty it shall be to reassure and endeavor to quiet bed patients in the immediate zone of fire or smoke, and proceed to move the beds of the more seriously excitable to points of vantage in the event of the need for evacuation. By this time, assistance of monitors should be available, and an adequate force must stand guard for this emergency.

1164. If the fire is uncontrollable, or has developed a bad smoke hazard, all available guards, monitors and firemen shall move patients out of the sections involved by rolling or sliding their beds or mattresses through horizontal exits or down ramps where available; or, as a last resort, if required by continued fire and smoke spread in the sections vacated, by carrying patients in mattresses down stair towers and to the outside.

FIRE EXIT DRILLS IN SCHOOLS

(See also Section 21)

1170. The following requirements are of necessity, general in scope, as it is appreciated they must apply to all types of schools as well as [illegible]ions of occupancies, such as truant schools, schools for mentally defe[illegible], the blind, deaf and dumb, colleges 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.

1171. There shall be at least eight fire exit drills a year. In those climates where the weather is severe during the winter months, it is suggested that weekly drills be held at the beginning of the school term so as not to endanger the health of the pupils.

NOTE: It might be well to hold "practice" drills during inclement or winter 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.

1172. Drills should 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. In other words, they should be executed at such irregular times as would tend to destroy any possible distinction between drills and actual fires. Cards of instruction should be conspicuously posted describing the procedure of the drills.

1173. If a drill is called when pupils are going up and down the stairways, as during the time classes are changing without any semblance of order, the pupils should be instructed to form in file and immediately proceed to the nearest available exit in an orderly manner.

1174. Exit drill alarm systems should be installed in accordance with the requirements of Section 10 of this code. All exit drill alarms should be sounded on independent signal systems and not on the signal system used to dismiss classes. Instructions in the manner of sounding exit drill signals and sending fire alarms should be given to all pupils so that there will be no delay either in emptying the building or calling the fire department in case of an actual fire. 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. (See §1018.) 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 buttons should be kept under lock, the key for which should 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.

1175. As all drills represent an actual fire condition (see §1103) pupils should 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. In order to avoid congestion around the school building which might interfere with the local fire department, each class or group should move to a predetermined point.

1176. Wherever possible, drill lines should not cross a street or highway, especially where the traffic is heavy. Where necessary for drill lines to cross roadways, hand signals reading 'STOP! SCHOOL FIRE DRILL'

shall be carried by monitors to the traffic intersecting points in order to stop traffic during the period of the drill.

NOTE. It is recommended that where drill lines must cross roadways, a police officer, school janitor, or a male teacher acting as a traffic officer be on duty to control traffic during drills.

1177. Every fire exit drill shall be an exercise in school management for principal and teachers. The chief purpose of every drill is 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 should be prohibited. In case there are pupils incapable of holding their places in a line moving at a reasonable speed, provisions should be made to have them taken care of by the more sturdy pupils, moving independently of the regular line of march.

1178. 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 and assist in every practical manner to create an orderly and perfect drill. 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 preceding lines. 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.

1179. 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. 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, 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.

Section 12.

LIGHTING AND SIGNS.

Exit Illumination.

1201. All stairways and exits and the passageways appurtenant thereto shall be properly illuminated to facilitate egress. Such illumination shall be continuous during the time that the conditions of occupancy require that the exit ways be open or available. Artificial lighting shall be employed at such places and for such periods of time as required to maintain the illumination to the full intensities herein specified.

1202. (a) The floors of exit ways of buildings used for public assembly or congregation, schools, department stores, factories, mills and other occupancies as required by the several occupancy sections (Section 21 and following) shall be illuminated at all points such as angles and intersections of corridors and passageways, stairways, landings of stairs and exit doorways to intensities of not less than 1.0 foot-candle.

(b) In auditoriums and other places of assembly where pictures, motion pictures or other projections are made by means of directed light the illumination of the floors of exit ways may be reduced during such period of projection to intensities of preferably not less than one fifth of those specified under §1202 (a). At other times the full intensity of illumination should be as required above (a).

NOTE. §1202 prescribes the minimum intensities of illumination, but generally greater intensities should be provided. The additional illumination should be from lights placed alternately with the required emergency lights and supplied from the general lighting circuits or sources or other sources similar to the required emergency lighting sources.

For further information on recommended intensities of illumination, see the following standards of the Illuminating Engineering Society (Par. 13):

American Recommended Practice of Industrial Lighting A.S.A. A-11-1942.

American Recommended Practice of School Lighting A.S.A. A-23-1948.

American Recommended Practice of Office Lighting.

1203. The lighting source shall be arranged to assure continued illumination of all exitways in cases of emergency caused by the failure of the principal lighting of the building. Where electric current is the source of the lighting of buildings used for public assembly or congregation, the emergency lighting shall be from a source independent of that for the general lighting or shall be controlled by an automatic device which will operate reliably to switch the circuit to an independent secondary source in the event of failure of the primary source of current. Such electrical installations shall be in accordance with Article 700 of the National Electrical Code.

The requirement for lighting of exits from a source independent of the general building lighting will apply only to:

(a) All places of assembly.

Exceptions: (1) Churches used exclusively for religious purposes.

(2) Places of public assembly where assembly room floor area does not exceed 7,000 sq. ft. and where exit doors are

within 5 ft. of grade level and where there are no balconies and where all exits lead directly to the outside of the building.

(b) Department stores of over 5,000 sq. ft. area on any one floor.

(c) Hotels with sleeping accommodations for more than 100 persons.

(d) Hospitals and sanitariums in accordance with §2466.

1204. The lighting and all control apparatus shall be installed so as to be under the supervision of and controlled only by authorized persons.

Exit Signs.

1205. Exit doors and passageways shall have signs visible from the exit approach indicating the way of egress. For auditoriums or other places of public assembly accommodating 200 persons or more there shall be placed over each door or doorway to be used for egress a sign with the word EXIT in plainly legible letters not less than 6 inches high and with principal strokes of such letters not less than ¾ inch in width. All other places, where so required by the several occupancy sections, shall have each exit door or exit way marked by signs with plainly legible letters not less than 6 inches high or by internally illuminated signs with letters not less than 4½ inches high. Signs in corridors and other passageways where necessary to indicate the direction of egress shall have the words TO EXIT with a suitable pointer or arrow indicating the way. The lettering shall be of sizes not smaller than required for the exit signs.

Exit signs shall be over doors or exitways and shall be suitably illuminated by a reliable light source giving an intensity of not less than 5 footcandles on the illuminated surface. Such illumination shall be continuous as required for exit ways. Except where otherwise required by law or ordinance, exit signs shall have white letters on a red field or, for the internally illuminated types shall have red letters of translucent material in an opaque field. Artificial lights giving illumination to exit signs other than the internally illuminated types shall have screens, discs or lenses of not less than 25 square inches area made of translucent material to show red on the side of the approach.

NOTE: Except where otherwise required by law or other compelling circumstance, the light source should give a white light for the better illumination of the sign and the vicinity of the exit door.

1206. Exit signs, where electrically lighted, shall be connected with an independent lighting source, as provided in §1203.

PART B.

OCCUPANCY EGRESS REQUIREMENTS.

Section 20.

GENERAL REQUIREMENTS.

Introduction.

2000. The following "Occupancy Sections" indicate the manner in which the various standards given in Part A should be applied to the several occupancies. In all cases where there may be differences between the requirements of the Occupancy Sections and those of the various "Engineering Standards" in Part A the provisions of the Occupancy Sections take precedence.

2001. The fundamental principle of the code is to provide exits sufficient to empty buildings promptly in case of fire, and to provide for construction and protection such that buildings may be emptied without danger to life by fire, smoke, or resulting panic. Property damage is not the concern of this code, although many of the requirements for life safety will incidentally contribute towards fire safety for property.

2002. The several Occupancy Egress Sections specify certain minimum standards of construction and protection; buildings not complying with these minimum standards are not considered safe no matter what exit facilities are provided. For buildings which comply with these minimum requirements rules are made specifying the number and character of exits required which vary in accordance with the occupancy and the safety of the building.

GENERAL REQUIREMENTS.

2010. The following general requirements apply to buildings of all occupancies, subject to the detailed specifications of the several occupancy sections. Where there are differences between these general requirements and those of the several occupancy sections following, the provisions of the occupancy sections take precedence for the specific occupancies to which they apply.

NOTE. Each occupancy section will be found to be complete in itself so that except where specific cross references are given it will not be necessary to refer to this section in the application of the code. The primary purpose of this section is to establish in convenient form for reference the fundamental principles on which the following occupancy sections are based.

2011. All buildings or sections thereof, and all floors of such buildings or sections shall have exits in such number and character as prescribed under the occupancy sections of this Code applicable thereto.

2012. The exits shall be so arranged that the maximum travel to reach the nearest exit is as follows:

High hazard occupancy	75 ft.
Moderate or low hazard occupancy	100 ft.
Office buildings	150 ft.
Moderate or low hazard buildings completely protected by a system of automatic sprinklers in-	

stalled and maintained in accordance with the standards of the National Fire Protection Association. (See §14) ..... 150 ft.

Theatres or other places of assembly with floor not to exceed 21 inches from grade level, as per Section 25, §2531 ..... 150 ft.

The distance shall be measured from the most remote point to the exit except that where a moderate or low hazard occupancy area is divided into rooms or apartments, as in office buildings or hotels, the distance shall be taken from the corridor entrance of such rooms to the nearest exit.

(For classification of occupancy hazard see §§2017-2021.)

2013. The relation between the maximum number of persons on each floor (including basement, but not the street or ground floor which is treated separately by §2014) and the exits shall be determined by the following table, subject to the provisions of the several occupancy sections.

	NUMBER PERSONS PER STORY PER UNIT EXIT WIDTH	
Occupancy	*Stairs enclosed as per code and existing sprinklered buildings*	*Stairs open and no Automatic Sprinklers (existing buildings)*
High hazard	30	15
Moderate or low hazard, (except as below)	60	30
Institutional and Residential	30	15
Public Assembly, having main entrance at street level, not communicating with other occupancies, and provided with all safeguards specified in Sec. 25.....	100	

It is intended that any given stairway may be used as a required exit from all the floors which it serves. If for example the third story of a building is required to have three stairways, and the second story three stairways, the second floor may utilize the stairways also serving the third floor, so that the total number of stairways required will be three, not six.

2013A. The number of persons used in determining the necessary exit facilities on any given floor shall be the actual number to occupy the floor but in no case less than that determined by dividing the following areas per person into the gross area (no deduction for corridors, closets or other subdivisions) within the perimeter of the building serving each particular occupancy at the given floor level; for occupancies not specified the building official shall, by rule, establish the ratio to be used:

Occupancy	*Gross Areas Per Person Sq. Ft.*
Dance hall, lodge room, and places of assembly (see page 72).....	15
Store, street floor and sales basement.....	30
other floors	60

(Table continued page 64)

Occupancy Cont'd	*Gross Areas Per Person Sq. Ft.*
School, courtroom and other similar public occupancy	40
Office, factory and workroom	100
Hotel and apartment	125
Institutional	150
Warehouse, storage and garage	300

In places of assembly, theatres, dance halls, lodge rooms and similar occupancies when seating arrangements are used or contemplated, the seating capacity shall be established by allowing 6 square feet per person in that portion occupied by the audience.

The population of basements or portions of basements or of mezzanine floors shall be determined according to the occupancy.

The population of a mezzanine floor discharging through a floor below shall be added to the population of such floor.

2014. The street or ground floor exits shall be as follows:

Occupancy	*No. persons per unit of exit width*
High hazard	50
Moderate or low hazard (except as below)	100
Institutional (hospitals and sanitariums) and Residential	50
Public Assembly, having main entrance at street level, not communicating with other occupancies, and provided with all safeguards specified in Section 25	100

NOTE. The doors specified by this paragraph are for the first floor population and are in addition to those required at the foot of the stairways.

2015. The height of new buildings shall be limited to the number of stories indicated in the following table, except as lesser height limits are specified by occupancy sections (schools §2106-§2108; hospitals and sanitariums §2413-§2416; places of public assembly §2531-§2533; hotels §2626; office buildings §2741; apartment houses §2824). For existing buildings see §2016.

	HEIGHT IN STORIES		
	Low Hazard	*Moderate Hazard*	*High Hazard*
Frame construction	3	2	1
Masonry Wall and Joist	6	4	2
Heavy Timber	7	6	4
Fire-Resistive	No limit	No limit	5

NOTE: There is a limit of height of combustible and hazardous occupancy buildings above which it is believed that exit facilities, no matter to what extent provided, cannot be relied upon for life safety. This is the reason for the inclusion of height limits. It should be noted that these are specified from the viewpoint of life safety, and may not coincide with height limits specified for other purposes.

2016. Existing buildings may be occupied two stories higher than the limits specified by §2015, if completely protected by a system of automatic sprinklers installed and maintained in accordance with the standards of the National Fire Protection Association. (See §14.)

(For special requirements for existing school buildings see Section 21; hospitals and sanitariums, Section 24; hotels, Section 26; office buildings, Section 27; and apartments, Section 28.)

Occupancy Classification.

2017. The hazard of occupancy of buildings shall be determined in accordance with the following paragraphs, subject to the provisions of the occupancy sections applying. (The several occupancy sections in general classify the hazards of the specific occupancies treated.) For some occupancies, such as factories, the hazard of the materials stored or used varies widely and the occupancy classification should be varied accordingly by the enforcing authority.

NOTE. The hazard of the contents of a building is an important factor in life safety and in the exits required. (See §2013.)

2018. Where more than one occupancy classification hazard is found in a single building, the most hazardous occupancy found shall govern exit construction and height requirements, except that where higher hazard occupancies are found on upper floors and lower hazard occupancies are found on lower floors, so that the safety of egress of the population of the lower hazard area will not be endangered by fire in the higher hazard area, exceptions may be made by the enforcing authority.

2019. Low HAZARD occupancies are those having contents which do not ordinarily burn rapidly or with excessive smoke and from which neither poisonous fumes or explosions are to be feared in case of fire.

The following list indicates the types of occupancy coming within this class:

Hospitals (where no exposure from nitrocellulose film or hazardous gases).

Schools.

Office Buildings.

Industrial properties with occupancies such as:

Asbestos.
Baking Powder.
Black lead.
Buttons (pearl or bone).
Canneries (for fish, fruit, and vegetables).
Chalk and crayon.
Condensed milk.
Glass.
Glue, mucilage, paste, and size.
Ivory.
Leather (excluding boots and shoes and japanning or enameling).
Metals (excluding japanning or enameling).
Porcelain and pottery.
Talc and soapstone.
Tanneries (excluding japanning or enameling).

2020. MODERATE HAZARD occupancies are those having contents which are liable to burn with moderate rapidity and to give off a considerable volume of smoke, but from which neither poisonous fumes nor explosions are to be feared in case of fire.

The following list indicates the types of occupancy coming within this class:

Department Stores.

Industrial properties with occupancies such as:

Bags (cloth, burlap, and paper).
Bagging and burlap.
Bakeries.
Baskets.
Belting (canvas).
Boots and shoes.
Buttons (metal or cloth covered).
Canvas.
Cardboard.
Carpets and rugs.
Clothing (woolen).
Cordage.
Furs.
Hair goods.
Horn and combs (not pyroxylin plastic).
Packing houses.
Paper mills.
Printing, lithographing, bookbinding.
Soap.
Textile mills.
Tobacco, cigars, cigarettes, and snuff.
Woodworking (excluding dipping or varnishing).

2021. HIGH HAZARD are those having contents which are liable to burn with extreme rapidity or from which poisonous fumes or explosions are to be feared in the event of fire.

The following list indicates the types of occupancy coming within this class:

Dry Cleaning Establishments.

Industrial properties with occupancies such as:

Artificial flowers.
Artificial leather.
Carpet linings.
Celluloid.
Cereal mills.
Chemicals of all kinds (except where serious flame, fume, or explosion hazards are not present).
Clothing (cotton).
Cotton batting.
Cotton waste.
Explosives.
Feather renovating.

Feed, flour, and grist mills.
Fireworks.
Japanning or Enameling.
Imitation Leather.
Matches.
Rag sorting (cotton).
Shoddy, mills.
Starch mills.
Straw goods.
Varnish.
Woodworking (with dipping or varnishing).

Maintenance.

2031. All exits shall be maintained to provide free and unobstructed egress at all times when the building is occupied.

Section 21.

SCHOOLS.

Introduction.

2101. The purpose of this code is to provide exits sufficient to empty school buildings promptly after alarm of fire has been given, and to provide for construction such that buildings may be emptied without danger to life by fire, smoke or resulting panic. Many of the requirements made for life safety will incidentally contribute materially toward fire safety of school building property.

2102. This section does not go into details of stairway construction and other engineering standards, but hereinafter makes reference to the engineering standards sections of the code for such features, covering here only features where variations from the general standards apply to school buildings.

2103. This code gives minimum requirements in all cases; better construction should be used where circumstances permit.

Buildings of low height are recommended because of their greater life safety and should be used where land is available; this code, however, recognizes the necessity for higher buildings in cities and provides accordingly.

New Building Construction. (For Existing Buildings see §§ 2147-2153).

2104. The following requirements (§§ 2105-2120) shall govern construction and limit heights.

2105. For the purposes of this section of the code, the basement (or ground story) shall be considered as a story if the floor of the principal story ("first floor") is more than 8 ft., 6 inches above the grade level at any point next to the building. Service and entrance areaways encompassing not more than 10 per cent of the perimeter of the building may be omitted from the determining grade level.

NOTE: This is to prevent evasion of requirements, e.g., by designating as "two story and basement" a building which, from a life safety standpoint, is really a three story building.

2106. All buildings over two stories in height, and two-story buildings if basements are used or usable for any purpose other than the heating plant, shall be of fire-resistive construction.

2107. Buildings of from three to six stories in height (or two to five-story buildings if basements are used or usable for any purpose other than the heating plant) shall have fire-resistive floors, walls and partitions, but trim, finish floor, sash, doors and frames may be of wood, except where otherwise required.

2108. Buildings of more than six stories (and six-story buildings if basements are used or usable for any purpose other than the heating plant) shall be of fire-resistive construction throughout except that finish floor only may be of wood.

2109. The interior wall and ceiling finish in two-story buildings (see § 2107 for higher buildings) and in one-story buildings if basements are used or usable for any purpose other than the heating plant, where hollow wood studded wall and partition construction is used, shall be plaster, or

other finish equally smoke-tight. All hollow spaces in wood stud walls or partitions shall be fire stopped at floor lines with noncombustible material Board floors on wood joists shall be double with fire retarding felt or paper between layers. Wood or other combustible finish shall cover only minor portions of the wall surface and where used shall have plaster or equivalent backing (e. g. wood wainscoting prohibited).

2110. In buildings of more than two stories all glass between rooms and corridors shall be wired glass.

2111. All basement walls and partitions shall be of fire-resistive construction.

2112. It is recommended that the first floor be entirely of fire-resistive construction, except finish floor.

2113. Floor construction, except finish floor, shall be fire-resistive immediately above rooms used for manual training, domestic science, kitchens, laboratories, shops, boiler or heater rooms or fuel storage, or other similar occupancy.

2114. Doors to basement rooms of occupancies listed in §2113, leading to stairs, corridors or other lines of exit shall be self-closing, of metal or metal covered, and windows leading to corridors shall be approved wired glass windows with stationary metal frames.

HEATING PLANTS.

2115. All heating plants within school buildings, including fuel storage rooms, shall be completely surrounded by fire-resistive enclosures with self-closing fire doors protecting all openings thereto, except those in exterior walls.

AUDITORIUMS AND GYMNASIUMS.

(See also §2143.)

2116. Gymnasiums, if used for auditorium purposes, shall be classed as auditoriums.

2117. Auditoriums and gymnasiums should preferably be located on the first floor. No required independent exit should be more than four feet below the finished grade, nor, except balcony exits, more than twenty feet above the finished grade.

2118. If both an auditorium and gymnasium are provided in the same building (so that the gymnasium will not be used for auditorium purposes) the gymnasium may be located on any floor, provided the egress facilities are in accordance with the provisions of this code.

LIGHT WELLS AND SHAFTS.

2119. Light wells are not recommended. If provided, they shall be open at the top. If less than 10 ft. in least dimension, they shall be enclosed by walls having fire resistance at least equal to that specified for stair enclosures and shall have wired glass windows in stationary metal frames.

2120. Elevator and dumb waiter shafts shall be constructed of fire-resistive materials at least equal in fire resistance to the required stair

enclosures, and all openings shall be provided with approved fire doors (see Section 5) kept normally closed by means of proper hardware. Other openings such as dust and package chutes shall be enclosed or protected in a standard manner. Incinerator chutes shall be so arranged and protected that fire cannot travel back through them.

Number and Location of Exits.

2121. Stairways and other exits shall be provided in sufficient number to comply with the Rules for Determining Required Exits §§2135-2141), and shall also comply with the following requirements.

NOTE. The term "exit" is intended to describe egress secured through one or more openings leading out of doors either directly through a stairway, or through a way of access to such an opening or stairway, which way is protected by a smoke barrier.

2122. Not less than two enclosed inside stairs, ramps, smokeproof towers, or doors leading to the outside of the building remote from each other, shall be provided from every floor, including basements.

2123. Exits shall be so arranged with respect to corridors, passages and stair wells that there are no pockets or dead ends in which pupils might be trapped.

2124. All required stairways shall be located adjoining outside walls and shall open directly outdoors. This requirement shall not, however, be construed as prohibiting vestibules or other protection against cold or storm, provided there is no curtailment of the exit facilities, as herein specified.

2125. Exits shall be so located that at least one stairway or other exit will be within 100 feet (measured along the line of travel) of the corridor exit door of every room; provided that in buildings completely protected by an automatic sprinkler system installed and maintained in accordance with the requirements of the National Fire Protection Association (see §14), this distance may be 150 feet.

2126. Every room with a capacity of over 100 persons (2000 sq. ft. as per §2135, Note 1) shall have at least two doorways as remote from each other as practicable.

Corridors.

2127. Corridors shall be at least 8 ft. wide. Where doors swing into corridors the clear straight width shall not be less than six feet at any point. (See also §502A.)

NOTE. It is recommended that in elementary schools lockers should not be located in corridors.

Stairway Construction.

2128. Stairs shall be Class A or Class B as specified in the section of this code on stairways. (See §§120-130 and preceding general requirements of Section 1.)

No winders shall be permitted on stairs used by pupils irrespective of whether stairs constitute required means of egress. In elementary schools intermediate hand rails shall be provided where width exceeds 66 inches. (See §117.)

2129. Wherever stairways are specified in this code, ramps of the same class (see Section 3) may be substituted.

Stairway Enclosures.

2130. All stairs shall be enclosed with enclosures Types Nos. 1, 2 or 3 as specified in the section of this code on Stairways (See §§135-144), except that the partitions separating the corridor from the stair hall may be of wired glass in metal frame, or of approved glass blocks. Doors in such partitions shall be of clear wired glass in metal frames (Class C).

Doors and Smoke Stops.

2131. All doors into stair enclosures shall be of the self-closing type, shall swing with the exit travel and be smoke resistive.

NOTE. By a smoke-resistive door is meant a light door of metal or metal covered or other approved type with clear wired glass panels.

2132. A smoke barrier, with double swing door or doors, of smoke-resistive construction as defined by the foregoing note, should preferably be provided across each corridor between each two stairways, and shall be provided one in every corridor of 300 ft. or more in length, and in any case not over 300 ft. apart.

In buildings of non-fire-resistive construction not over two stories in height smoke barrier doors may be of ordinary wood panel type not less than 1⅜ in. thick with clear wired glass panels.

2133. Doors in smoke barriers and in stair enclosures, if kept normally open, shall be provided with fusible link holds or equivalent devices and shall also be provided with friction devices of a type that may be readily disengaged, so arranged that the doors will be released by heat or may be readily released manually.

2134. Exterior doors shall be operated by bars or other panic hardware device, in accordance with §512.

Rules for Determining Exits.

2135. EXITS FROM UPPER STORIES. For floors above the first, stairways or ramps shall be provided conforming with the preceding general requirements, in accordance with the following formula:

$$\text{Number units exit width (one unit = 22 inches)} = \frac{\text{Gross area per floor (square feet)}}{2400^*}$$

NOTES: (1) This formula is derived from §2013, figuring one person per 40 square feet of gross area per floor, and one unit of stairway width for each 60 persons. This provides exits sufficient to empty a three-story building in about 1½ minutes. The figure of 40 sq. ft. per person is based on a net area used for class rooms of half the gross floor area, with an occupancy of one person per 20 sq. ft. of net area used for educational purposes. This provides for average population of most crowded schools as shown by counts of typical schools, and is in substantial agreement with various state laws governing school construction.

(2) Where foregoing requirements for construction, enclosure of stairways, etc., are not met, additional exits may be required.—See Existing Buildings, §§2146-2169.

*[60(§2013) x 40(§2013A)]

(3) It is intended that any given stairway may be used as a required exit from all the floors which it serves. If for example the third story of a building is required by the formula to have three stairways, and the second story three stairways, the second floor may utilize the stairways also serving the third floor, so that the total number of stairways required will be three, not six.

2136. Auditoriums and gymnasiums which may be used for auditorium purposes are figured separately on the basis of one person for each 6 square feet of net floor area. (See §2543.)

2137. The required exits specified by §2135 shall lead by a direct line of travel to the ground.

2138. A unit of stairway width shall be 22 in. All stairways shall be at least 2 units wide. A unit of door width shall be 22 in. but a 40 in. door may be accepted as 2 units. (See §504.)

2139. All stairways from upper floors shall be continuous from the top floor to the ground level, except stairs used exclusively by janitor or other employees.

2140. BASEMENT EXITS. The basement (or "ground story") shall be treated the same as an upper story in accordance with §2135, and exits shall be provided accordingly, either stairs leading to the first story or doors leading directly outdoors.

2141. STREET FLOOR EXITS. First floor doors shall be provided as follows:

(*a*) One unit of door width for each unit of stairs from upper floors.

(*b*) One additional unit of door width for each unit of required stairs from basement.

(*c*) One additional unit of door width for each 4000 square feet (one person per 40 sq. ft. gross floor area x 100 persons per first floor exit unit) or fraction thereof of gross area of the first floor.

(*d*) One additional unit of door width for each 600 square feet (one person per 6 sq. ft. net floor area x 100 persons per first floor exit unit) or fraction thereof of floor area of auditorium and gymnasiums on the first floor.

NOTE: See §110 for conditions under which doors serving stair may be reduced in width. See Section 25 for conditions under which smaller number of exits may be permitted for auditoriums and gymnasiums.

2142. EXAMPLE. Assume a three story and basement building. Assume that there is an auditorium (no basement) in a wing 50 x 60 feet on the first floor; first floor area (including auditorium) 10,500 square feet, other floors 7500 square feet per floor. Assume that there are no independent exits from basement and that the occupants of the basement must use first floor exit doors.

Stairs from upper stories will be, substituting in the formula §2135:

$$\text{No. units stair width} = \frac{7500}{2400} = 3\tfrac{1}{8}.$$

Therefore 2, 2-unit stairways will be required. Stairs from basement will be the same.

Street floor doors required to comply with §2141 will be

(*a*) To serve stairways from upper floors 4 units.

(*b*) To serve stairways from basement 4 units.

(*c*) To serve first floor, $\frac{7500}{40 \times 100} =$ 2 units.

(*d*) To serve auditorium, $\frac{50 \times 60}{6 \times 100} =$ 5 units.

Total street floor doors required = 15 units.

This street floor door requirement may be satisfied by providing 7, 40-inch doors and one single unit door or other equivalent arrangement. The doors (*a*) and (*b*) should be located at the stairs, the doors (*d*) should provide a path of travel to the open air as direct and short as possible.

The doors (*c*) may be at any convenient location, so disposed that the requirement for two ways out of every floor area will be satisfied.

Auditoriums.

2143. (a) For auditoriums and gymnasiums exit facilities shall be provided in general conformity with those hereinbefore specified for other parts of the building.

(b) 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 class room sections, except in case of auditoriums and gymnasiums of types suitable only for use of the school population (and therefore not subject to simultaneous occupancy) in which case the same exit facilities may serve both sections.

(c) Where school auditoriums are designed for general public assembly purposes they shall conform to Section 25 of this code.

FIRE ALARM.

2144. Every building shall be equipped with a manually operated fire alarm in accordance with Section 10, which shall be tested daily during the school term.

NOTE. Code signals indicating where the alarm originates are not recommended for schools (see §1017).

Lighting and Signs.

2145. All auditoriums, assembly halls, gymnasiums, stairways, corridors, exits and exitways shall have illumination and signs in accordance with Section 12.

EXISTING SCHOOL BUILDINGS.

2146. It is recommended that existing buildings be made to conform to the foregoing requirements as far as possible. The following requirements for existing buildings afford a minimum degree of safety for such buildings. Each building should be taken as a special case to be considered on its own merits. In general it will be found that the installation of automatic sprinklers will be the most satisfactory method of compensating for construction deficiencies in existing school buildings.

Building Construction.

2147. The following requirements (§§ 2105-2120) shall govern construction and limit heights. (See Section 1 for definitions of terms used in describing types of building construction.)

(*a*) For the purposes of this section of the code the basement (or ground story) shall be considered as a story if the floor of the principal story ("first floor") is more than 8 ft., 6 inches above the grade level at any point next to the building. Service and entrance areaways encompassing not more than 10 per cent of the perimeter of the building may be omitted from the determining grade level.

NOTE: This is to prevent evasion of requirements, e.g., by designating as "two story and basement" a building which, from a life safety standpoint, is really a three story building.

2148. As minimum requirements for existing buildings of two stories or higher where hollow wood studded wall and partition construction is used, the interior wall and ceiling finish shall be reasonably smoke-tight; board floors on wood joists shall be double with fire retarding felt or paper between the upper and lower flooring, except that existing tight double floors may be accepted without fire retarding felt or paper. For such buildings of over two stories the interior wall and ceiling finish shall be plaster or other finish equally smoke-tight and fire retardant. Wood or other combustible finish shall cover only minor portions of the wall surface (e. g. wood stair soffits and wood wainscoating prohibited) and where used, shall have plaster or equivalent backing.

2149. Boiler or heater rooms or rooms used for fuel storage shall in all cases have noncombustible or fire-restrictive enclosure walls and floors, with self-closing fire doors protecting all openings thereto, except those in exterior walls, and ceiling protection of cement or gypsum plaster on metal lath or equivalent. Interior windows between boiler or heater rooms or rooms used for fuel storage and corridors used for exits shall be wired glass in stationary sash.

2150. Three-story non-fire-resistive buildings may be accepted provided basements and rooms used for manual training, domestic science, kitchens, laboratories, shops, boiler or heater rooms, rooms used for fuel storage or similar occupancy, have walls and ceilings finished on the inside with cement or gypsum plaster on metal lath or equivalent fire and smoke-resistive coverings, and all hollow spaces in combustible floors, walls, and partitions above and around them firestopped with noncombustible material, or if rooms used for such occupancies are completely protected by an

automatic sprinkler system installed in accordance with National Fire Protection Association standards (see §14) and properly maintained.

2151. Four-story non-fire-resistive buildings may be accepted if basements are completely protected by automatic sprinklers and rooms of occupancies listed in §2150 and the ceilings under and the walls around the corridors used for exit, are finished on the inside with cement or gypsum plaster on metal lath, or with equivalent fire and smoke-resistive finish and all hollow spaces in combustible floors, walls and partitions around and above are firestopped with noncombustible material; or, if the whole building below the top story* is completely protected by an automatic sprinkler system installed in accordance with National Fire Protection Association standards, and properly maintained.

2152. Five-story non-fire-resistive buildings may be accepted if rooms of occupancies listed in §2150 and the ceilings under and the walls around the corridors used for exit, are finished on the inside with cement or gypsum plaster on metal lath, or with equivalent fire and smoke-resistive finish, and all hollow spaces in combustible floors, walls and partitions around and above are firestopped with noncombustible material; and in addition the entire building below the top story* is completely protected by an automatic sprinkler system installed in accordance with National Fire Protection Association standards and properly maintained.

2153. Auditoriums and gymnasiums should preferably be located on the first floor.

Gymnasiums if used for auditorium purposes, shall be classed as auditoriums.

Auditoriums may be allowed above the first floor if provided with proper exits as specified herein, and in the case of location above the second floor (see §2147a) if the entire building up to and including the auditorium or gymnasium story is of fire-resistive construction, or of ordinary construction with all walls and ceilings finished with cement plaster on metal lath or equivalent fire and smoke-resistive finish and all hollow spaces in walls and ceilings firestopped with noncombustible material; or if in addition to the minimum structural requirements of §2148, the whole building below auditorium or gymnasium level is protected by an automatic sprinkler system, installed in accordance with National Fire Protection Association standards, and properly maintained.

Number and Location of Exits.

2154. Stairways and other exits shall be provided in sufficient number to comply with the Rules for Determining Required Exits (§§2135-2141), as modified by §2167 and shall also comply with the following requirements.

2155. Not less than two exits, remote from each other, shall be provided from every floor, including basements.

2156. Exits shall be so arranged with respect to corridors, passages, and stair wells that there are no pockets or dead ends in which pupils might be trapped.

2157. Exits shall be so located that at least one stairway or other exit will be within 100 feet (measured along the line of travel) of the corridor

*NOTE. It is strongly advised that automatic sprinkler equipments be installed to protect the entire building, including the top story, although sprinklers may be omitted from the top story without seriously affecting the safety of occupants.

exit door of every room; provided that in buildings completely protected by an automatic sprinkler system installed and maintained in accordance with the requirements of the National Fire Protection Association (see §14), this distance may be 150 feet.

Corridors.

2159. Corridors shall be at least 8 ft. wide where doors swing into corridors, the clear straight width shall not be less than 6 ft. at any point.

NOTE. It is recommended that in elementary schools lockers should not be located in corridors.

Stairway Construction.

2160. Stairs shall be in accordance with the section of this code on stairways. (See §§120-130 and preceding general requirements of Section 1.)

No winders shall be permitted on stairs used by pupils irrespective of whether stairs constitute required means of egress.

2161. Wherever stairways are specified in this code, ramps of the same class (see Section 3) may be substituted.

Stairway Enclosures.

2162. Stairs shall be enclosed with enclosures Types Nos. 1, 2, 3 or 4 as specified in the section of this code on Stairways (see §§ 135-145), as follows:

(a) All basement stairways.

(b) All stairways in buildings of ordinary construction.

(c) Stairways in fire-resistive buildings three stories or more in height.

NOTE: Where all stairways are not enclosed, and automatic sprinkler protection is not provided, increased exit capacity is required by §2167.

DOORS AND SMOKE STOPS.

2163. All doors into stair enclosures shall be of the self-closing type, shall swing with the exit travel and be smoke resistive.

NOTE. By a smoke-resistive door is meant a light door of metal or metal covered or other approved type with clear wired glass panels.

2164. A smoke barrier with double swing door or doors, of smoke-resistive construction as defined by the foregoing note, should preferably be provided across each corridor between each two stairways, and shall be provided one in every corridor of 300 ft. or more in length, and in any case not over 300 ft. apart.

In buildings of non fire-resistive construction not over two stories in height, smoke barrier doors may be of ordinary wood panel type not less than 1⅜ in. thick with clear wired glass panels.

2165. Doors in smoke barriers and in stair enclosures, if kept normally open, shall be provided with fusible link holds or equivalent devices and shall

also be provided with friction devices of a type that may be readily disengaged, so arranged that the doors will be released by heat or may be readily released manually.

2166. Exterior doors shall be operated by bars or other panic hardware device. (See §512.)

Required Exits.

2167. The necessary exit capacity shall be determined by the same rules as for new buildings (§2135-§2141), except that an existing 40 in. stairway may be accepted as 2 units and a 34 in. stairway as 1½ units (see §147) and that where stairways are not enclosed (see §2162), and automatic sprinkler protection is not provided, the number of units of exit width as determined by §2135 shall be doubled. Where existing stairways do not provide the necessary number of units thus determined, the required capacity may be obtained by adding Class A Fire Escape Stairs (see §215-235). Enclosed Slide Escapes (Section 9), or Class B Fire Escape Stairs (§237-§249), may be accepted if already installed.

Fire Alarm.

2168. Every building shall be equipped with a manually operated fire alarm system in accordance with Section 10, which shall be tested daily during the school term.

NOTE: Code signals indicating where the alarm originates are not recommended for schools (see §1017).

Lighting and Signs.

2169. All auditoriums, assembly halls, gymnasiums, stairways, corridors, exits and exitways shall have illumination and signs in accordance with Section 12.

FIRE EXIT DRILLS

2180. Fire exit drills shall be conducted in accordance with Section 11.

Section 22.

DEPARTMENT STORES.

Introduction.

2201. The fundamental principle of this code is to specify exits sufficient to empty department store buildings in case of fire and to provide construction and protection such that buildings may be emptied without danger to life by fire, smoke or resulting panic. Property damage from fire is not the concern of this code, although many of the requirements made for life safety will incidentally contribute toward fire safety for department store property.

2202. This section does not go into details of stairway construction and other engineering standards but makes reference to the engineering standards sections of this code for such features, covering here only features where variations from the general standards apply to department store buildings.

2203. This code gives minimum requirements in all cases: better construction should be used where circumstances permit. It applies to both new and existing buildings; for existing buildings certain modifications are specified.

Number and Character of Exits.

2204. No portion of any building or section shall be more than 100 feet (along the line of travel) from the nearest exit; provided that in buildings completely protected by an automatic sprinkler system installed and maintained in accordance with the requirements of the National Fire Protection Association (see §14) this distance may be 150 feet. Exits shall be as remote from each other as practicable. Exits shall be so arranged with regard to floors that there are no pockets or dead ends of appreciable size in which occupants may be trapped.

2205. Not less than two means of exit shall be provided on every floor, including basements, of every building or section. On the street floor at least one of these shall be a door leading directly outside the building and the other shall be a door leading outside the building or a standard horizontal exit. On upper floors and basements, one exit shall be an inside stairway (or smokeproof tower) and the other or others shall be inside stairways (or smokeproof towers), moving stairways or horizontal exits.

NOTE. The exits required by this rule may also be included as constituting a part of the required exit capacity specified by §§2222-2226 but in no case shall any other provision of this code be construed as waiving this minimum requirement.

2206. Exit capacity as specified by §§2222-2226 shall be secured by providing standard egress facilities in accordance with the several sections of Part A applied and modified as follows (§§2207-2219):

STAIRWAYS:

2207. Stairways and stairway enclosures for required means of egress shall be in accordance with Section 1. Stairs shall be Class A or Class B

for new buildings and may be Class C for existing buildings. (See also §2227.)

Wherever stairways are specified, ramps of the same class (see Section 3) may be substituted.

2208. In buildings with standard automatic sprinkler protection, 50 per cent of the required stairways may discharge through the main street floor area instead of direct to the street as required by §110.

FIRE ESCAPE STAIRS:

2209. Fire escape stairs are not accepted as required means of egress for department store buildings.

HORIZONTAL EXITS:

2210. Horizontal exits shall be in accordance with Section 4.

2211. In fire-resistive buildings with standard automatic sprinkler protection, where fire-exit partitions are provided on all stories (and basements) except the street floor, credit may be received for horizontal exits if all required stairways or other exits from upper floors (and basements) are enclosed and discharge directly to outside the building as per §110 and where all vertical openings are enclosed or protected.

DOORS:

2212. Doors shall be in accordance with Section 5. Revolving doors are permitted subject to the restrictions of §§510, 511. (Revolving doors may be used between street floor and street, but not at foot of stairs.)

AISLES AND CORRIDORS:

2214. Aisles and corridors shall be in accordance with Section 6.

2215. The minimum width of any aisle leading to exterior doors shall be 5 feet, and the total width of aisles running parallel in either direction shall be at least as great as the required width of exit doors toward which the aisles lead.

ELEVATORS:

2216. Elevators should be in accordance with Section 7, but are not counted as required means of egress.

MOVING STAIRWAYS:

2217. Moving stairways, in accordance with the requirements of Section 8, may be permitted.

Moving stairways may discharge through the main street floor area under the conditions specified in §2208, provided that not more than 50% of the total exit capacity of stairs, and moving stairways discharges through the main street floor area.

SLIDE ESCAPES:

2218. Slide escapes (Section 9) shall not constitute required means of egress for department stores.

ALARMS AND DRILLS:

2219. Every building shall be equipped with a manually operated fire

alarm system in accordance with Section 10. Code signals may be used to alert personnel (see §1017).

2220. Fire exit drills shall be in accordance with Section 11.

SIGNS AND LIGHTING:

2221. Stairways, exits, exitways and places of assembly shall have illumination and signs in accordance with Section 12.

Required Exits.

2222. Units of exit width in accordance with §§2207-2218 shall be provided for each story above the first and for basements not used for sales in the amount determined by the following formula:

$$\text{Number units exit width (one unit = 22 inches)} = \frac{\text{Gross area of story (square feet).}}{60 \times 60}$$

NOTES: (1) This formula is derived from §2013, figuring one person per 60 square feet of gross area per floor, and one unit of stairway width for each 60 persons.

(2) It is intended that any given stairway may be used as a required exit from all the floors which it serves. If for example the third story of a building is required by the formula to have three stairways, and the second story three stairways, the second floor may utilize the stairways also serving the third floor, so that the total number of stairways required will be three, not six.

2223. Where foregoing requirements for construction, enclosure of stairways, etc., are not met in existing buildings, stairway requirements shall be doubled in accordance with penalties for substandard conditions in existing buildings, §2013.

2224. The exits required for sales basements shall be determined by the following formula:

$$\text{Number units exit width (one unit = 22 inches)} = \frac{\text{Gross area per floor (square feet).}}{30 \times 60}$$

NOTE: This formula is derived from §2013, figuring one person per 30 square feet of gross area per floor, and one unit of stairway width for each 60 persons.

2225. Basements, and upper floors, not used for sales purposes and occupied as work rooms, offices, etc., shall have exits determined on the basis of one person per 100 sq. ft. gross area per person or in accordance with the requirements of other sections of this Code for the actual occupancy.

Street Floor Exits.

2226. Street floor doors (in accordance with §§2212, 2213) shall be provided with number of units of width at least as many as the aggregate number of units of width of stairways, ramps, and moving stairways constituting required means of egress for upper floors and basements, plus one unit of door width for each 3000 square feet of street floor area.

Protection of Vertical Openings.

2227. All stairways, elevator shafts, and other vertical openings except as noted below shall be protected by enclosures not less than the following:

For new buildings—Enclosures Nos. 1, 2 or 3 (see §135-144).

For existing buildings—Enclosure No. 4 (see §145).

Exceptions:

One and two story buildings.

Moving stairways penetrating the first and second floors only of multi-story buildings where Enclosures Nos. 1, 2 or 3 are provided for the protection of all required means of egress and other vertical openings and stories above the second story are limited to storage occupancy.

Moving stairways not constituting required means of egress which are protected in accordance with §804(b).

Monumental stairs or moving stairways as permitted in §136.

Existing buildings not over three stories when protected by a standard automatic sprinkler system.

NOTE: It is strongly recommended that all stairways, elevator shafts and other vertical openings be enclosed or protected even where not required.

2228. *Mezzanine Floors* or Balconies may be permitted without protection of the vertical opening between mezzanine and floor below, provided there is not more than one mezzanine floor or balcony between complete floors above and below. Where there is a light well or open space piercing two or more stories, the entire building shall be considered to have unprotected vertical openings. Mezzanine floors shall be considered as half a story for the purposes of height limit requirements except that when the area of the mezzanine is more than 50% of the area of the floor immediately below it, the mezzanine shall be considered a story.

Limitations in Use of Buildings for Department Store Purposes.

2229. Buildings shall not be used for department store purposes above the heights specified in the following table. Higher stories in existing buildings may be used for storage purposes only.

Wood frame construction	2 stories
Masonry wall and joist construction	4 stories
Heavy timber construction	6 stories
Fire resistive construction	No limit

Existing buildings may be occupied two stories higher than the above limits, providing the building is completely protected by automatic sprinklers installed and maintained in accordance with the requirements of the National Fire Protection Association (see §14).

NOTE: This is based on §2015 and 2016. See Note following §2015 for explanation.

2230. All buildings having an aggregate gross area of all floors (including basements) used for department store purposes of over 25,000 square feet, shall be completely protected by an automatic sprinkler system installed and maintained in accordance with National Fire Protection Association standards (see §14). Where a building is divided by a fire wall or fire exit partition (see Section 4) into two or more sections, each such section may be considered as a separate building for the purposes of this rule.

Example of Exit Calculation.

2231. Assume a department store building: 50,000 square feet gross area per floor; fire-resistive construction; 7 stories; one sales basement; automatic sprinklers; all vertical openings protected; enclosed stairs; no moving stairways.

STAIRWAYS FROM UPPER FLOORS, substituting in formula §2222.

$$\text{No. units required} = \frac{50{,}000}{3600 \text{ (60 persons per unit, 60 sq. ft. gross area per person)}}$$

$$= 13.9 = 14 \text{ units of stairway width.}$$

These stairways must be so arranged that no portion of the building is more than 150 feet distant from one of them.

STAIRWAYS FROM BASEMENT, substituting in formula §2224.

$$\text{No. units required} = \frac{50{,}000}{1800 \text{ (60 persons per unit, 30 sq. ft. gross area per person)}}$$

$$= 27.8 = 28 \text{ units of stairway.}$$

This means 14, 2-unit stairways, or other equivalent arrangement.

STREET FLOOR DOORS (see §2226).

For stairways from upper floors	14 units
For stairways from basement	28 units

$$\text{For street floor} = \frac{50{,}000}{3000 \text{ (100 persons per unit, 30 sq. ft. gross area per person)}}$$

$= 16\frac{2}{3} =$ 17 units

59 units

This means 28, 40-inch doors and one, 60-inch door or other equivalent arrangement.

If arrangement is such that doors serve two or more stairways, door widths may be reduced in accordance with §110, making doors required as follows:

STREET FLOOR DOORS

For stairways from upper floors ¾ of 13.9	= 10.4 units
from basement ¾ of 27.8	= 20.7 units
For street floor	16.6 units
	47.7

Thus through the arrangement of street floor doors to serve two or more stairways from upper stories and basement, eleven first floor door units (59 units less 48 units) can be eliminated in the design of street floor exits.

Boiler Rooms.

2232. Rooms containing high pressure boilers, refrigerating machinery transformers or other service equipment subject to possible explosion should not be located directly under or adjacent to exits. All such rooms shall be effectively cut off from other parts of the building, and shall be provided with adequate vents to the outer air.

Air Conditioning.

2233. All air conditioning installations shall comply with the NFPA standards on this subject. (See §14.)

Section 23.
FACTORIES.

Introduction.

2301. The fundamental principle of this code is to specify exits sufficient to empty factory buildings promptly in case of fire and to provide for construction such that buildings may be emptied without danger to life by fire, smoke or resulting panic. Property damage from fire is not the concern of this code, although many of the requirements made for life safety will incidentally contribute toward fire safety for property.

2302. This section does not go into details of stairway construction and other engineering standards but makes reference to the engineering standards sections of this code for such features, covering here only features where variations from the general standards apply to factory buildings.

2303. This code gives minimum requirements in all cases; better construction should be used where circumstances permit. It applies to both new and existing buildings; for existing buildings certain modifications are specified.

Number and Character of Exits.

2304. No portion of a building or section shall be further (along the line of travel) from the nearest exit than the following distances (see §2012, and §2017-§2021).

High hazard occupancy	75 ft.
Medium or low hazard occupancy	100 ft.
Medium or low hazard occupancy, building completely protected by a system of automatic sprinklers installed and maintained in accordance with the standards of the National Fire Protection Association (see §14)	150 ft.

2304A. In buildings used for aircraft assembly or other occupancies requiring undivided floor areas so large that the distances from points within the area to the nearest outside walls are in excess of 150 feet, and the basement or other floor area does not provide suitable exitways, exits within the required maximum distances may be provided by stairways leading down to tunnels under the floor extending to the outside of the building, provided that such tunnels shall be adequately lighted and maintained (as required by Par. 2031) and shall be recognized as exits only if normally used by employees for entrance to and exit from the building. By special ruling, the enforcing official may also permit other exit arrangements with distances in excess of the maximum distances specified above if complete automatic sprinkler protection is provided and if ceilings are sufficiently high or automatic roof ventilation is provided such as to minimize the possibility that employees will be overtaken by the spread of fire or smoke within 6 feet of the floor level before they have time to reach exits.

2305. Not less than two means of exit shall be provided on every floor, including basements, of every building or section. On the street floor at least one of these shall be a door leading directly outside the building, and the other may be a door leading outside the building, or a standard horizontal exit. On upper floors and basements, one shall be an inside stairway (or smokeproof tower) and the other or others may be

inside stairways (or smokeproof towers), moving stairways or horizontal exits; or on existing buildings only, fire escape stairs. (See also §2315.)

NOTE. The exits required by this rule may also be included as constituting a part of the required exit capacity specified by §2318 but in no case shall any other provision of this code be construed as waiving this minimum requirement.

2306. Exit capacity as specified by §2319 shall be secured by providing standard egress facilities in accordance with the several sections of Part A applied and modified as follows:

STAIRWAYS:

2307. Stairways and stairway enclosures shall be in accordance with Section 1. Stairs shall be Class A or Class B for new buildings and may be Class C for existing buildings.

Class C stairs may be permitted in new buildings of low or moderate hazard occupancy having an aggregate gross area of all floors (including occupied basements) not over 5,000 square feet and occupied by not more than 50 persons.

Wherever stairways are specified, ramps of the same class (see Section 3) may be substituted.

FIRE ESCAPE STAIRS.

2308. Fire escape stairs are not permitted as required means of egress for new factory buildings, but Class A or Class B fire escape stairs not exceeding six stories or 70 ft. in height constructed in accordance with Section 2 may be accepted on existing buildings. Existing Class C fire escape stairs not exceeding 4 stories or 45 ft. in height may be accepted on existing buildings.

HORIZONTAL EXITS:

2309. Horizontal exits shall be in accordance with Section 4.

DOORS:

2310. Doors shall be in accordance with Section 5. Revolving doors shall not be used in factory buildings.

AISLES AND CORRIDORS:

2312. Aisles and corridors shall be in accordance with Section 6.

ELEVATORS:

2313. Elevators shall be in accordance with Section 6. They are not counted as required means of egress.

MOVING STAIRWAYS:

2314. Moving stairways, in accordance with Section 8, may constitute required means of egress. Reversible moving stairways are permitted.

SLIDE ESCAPES:

2315. Slide escapes (Section 9) shall not constitute required means of egress for factories except that for factories of high hazard occupancy (§2013) they may be permitted subject to the limitations of §901.

ALARMS AND DRILLS.

2316. Manually operated fire alarm systems in accordance with Section 10 which may be coded to indicate the location from which the alarm originates (§§1017 and 1124), shall be installed in buildings, or parts thereof,

in high hazard occupancies or in which 25 or more persons are engaged in work or labor in connection with the fabrication, assembly, manufacturing or processing of low or moderate hazard products or materials except under the following conditions:

(a) Buildings completely protected by an automatic sprinkler system installed and maintained in accordance with the NFPA Standards on Sprinkler Equipments, and provided with approved supervisory service designed to transmit an alarm to the fire department in case of fire.

(b) One story undivided area buildings clearly visible to the occupants throughout.

NOTE. Multiple occupancy multi-story industrial buildings warrant careful attention to the provision of adequate alarm facilities in each occupancy, particularly in buildings of non-fire resistive construction. Alarm devices in corridors only, of such occupancies, may be inaudible to the tenants unless each is separately considered as to alarm requirements (see also §1006).

2317. Fire exit drills shall be in accordance with Section 11.

Signs and Lighting.

2318. Stairways, exits, exitways and places of assembly shall have illumination and signs in accordance with the requirements of Section 12.

Required Exits.

2319. Units of exit width in accordance with §§2305-2315 shall be provided for each story above the first, as follows:—

Low or medium hazard occupancy

$$\text{Number Units exit width} = \frac{\text{Gross area of story (square feet).}}{30 \times 100}$$

High hazard occupancy.

$$\text{Number Units exit width} = \frac{\text{Gross area of story (square feet).}}{60 \times 100}$$

In existing buildings where requirements for the enclosure of stairways are not met, and automatic sprinkler protection is not provided, the number of units of exit width shall be doubled in accordance with penalties for substandard conditions in existing buildings in §2013.

NOTE: These formulae are derived from the basic formula §2013 (which see for explanation) on the basis of an average maximum population of one person for each 100 square feet of gross floor area of upper floors, 60 persons per unit of stair width for low or moderate hazard and 30 persons per unit of stair width for high hazard occupancy.

It is intended that any given stairway may be used as a required exit from all the floors which it serves. If, for example, the third story of a building is required by the formula to have three stairways, and the second story three stairways, the second floor may utilize the stairways also serving the third floor, so that the total number of stairways required will be three, not six.

2320. The basement shall be treated the same as an upper story in accordance with §2319, and exits provided accordingly, either stairs leading to the first story or doors leading directly outdoors.

2321. Street floor doors shall be provided with number of units of width at least as many as the aggregate number of units of width of stairways, ramps, and moving stairways constituting required means of egress for upper floors and basements, plus one additional unit of door width for each 10,000 square feet of street floor area in buildings of low or moderate hazard occupancy, and for each 5,000 square feet in buildings of high hazard occupancy.

NOTE: See §110 for conditions under which doors serving stairs may be less than stairs.

Posting Allowed Capacity.

2322. On each floor and in each section of each factory building there shall be posted the number of occupants to be permitted, as determined by the code, and the manufacturing processes permitted or prohibited. The number allowed shall be on the basis of 1 person per 100 square feet gross floor area, except that when exit facilities are different from the requirements of §2319—§2321, the number allowed shall be modified proportionately.

Limitations in Use of Buildings for Factory Purposes.

2323. The height of buildings of various types of construction, protection and occupancy shall not exceed the maximum height determined by the table §2015. See also §2016 for existing buildings.

Protection of Vertical Openings.

2324. All stairways, elevator shafts and other vertical openings except as noted below shall be protected by enclosures not less than the following:

For new buildings—Enclosures Nos. 1, 2 or 3 (see §§135-144).

For existing buildings—Enclosure No. 4 (see §145).

Exceptions:

One and two story buildings of low or moderate hazard occupancy

Ornamental stairs as permitted in §136.

Moving stairways not constituting required means of egress which are protected in accordance with §804(B)

Section 24.

HOSPITALS AND SANITARIUMS.

Introduction.

2401. The purpose of this section of the Code is to promote life safety from fire in hospitals and sanitariums. Exits or character of construction alone are not sufficient to provide proper safety for occupants physically or mentally disabled or under restraint. For this reason this section is treated differently from other sections of the Code, and more emphasis is placed upon contruction of buildings, fire prevention and fire protection. Horizontal exits are considered of especial value, and relatively greater credit is given to horizontal exits and to ramps than in other sections of the Code (see Section 4—Horizontal Exits).

Safety to life from fire in hospital and institutional buildings requires that the superintendent and staff give attention to and take adequate measures to meet their responsibilities in all details affecting the fire safety of patients, which is often lost sight of where the needs for medical attention and care of patients absorb the attention of those in charge. Those in authority should be made to realize that the protection of the sick and helpless against loss of life by fire or smoke is a responsibility of importance comparable to that of medical attention.

2402. Safety to life in buildings of this occupancy requires,
(a) Proper construction of buildings.
(b) Adequate exits.
(c) Careful housekeeping and protection of fire hazards.
(d) A competent, trained staff having adequate personnel on duty at all times.

This section of the Code deals only with structural and exit features and the protection of hazards in so far as this can be accomplished by physical safeguards. It should not be inferred that this section of the code will provide safety unless the other features are also properly covered.

NOTE: Careful housekeeping can be relied upon to reduce the number of fires in good buildings. 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 rooms for smoking. Proper education and training of the staff and attendant corps 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 superintendent in charge.

2403. It is recognized that in institutions or parts of buildings housing various types of psychiatric patients, it is necessary to maintain locked doors and barred windows. It is also recognized that certain types of psychiatric patients are not capable of seeking safety without adequate guidance by hospital personnel. In buildings where this situation prevails, reliable means for the rapid release of patients must be provided, such as the remote control of locks, or by keying all locks to keys commonly used by attendants. Frequent inspection and proper maintenance are necessary to insure the dependability of the method of evacuation selected. Institutions which find it necessary to provide a substitute for door locks required elsewhere herein for exits, must accept the responsibility for adequately staffing the sections of a building for which such exceptions are made at all times.

2404. The use of roller casters is recommended for beds in hospital and infirmary sections.

2405. This section does not go into details of stairway construction and other engineering standards, but makes reference to the other sections of the Code for such features, covering here only features where variations from the general standards apply to hospital and sanitarium buildings. In cases where there are differences between this section and the general provisions of other sections the provisions of this section take precedence for buildings of this class of occupancy.

NEW AND EXISTING BUILDINGS.

2406. This Section of the Code applies to both new and existing buildings; for existing buildings less exacting requirements are made. (See provisions on Existing Buildings.) Where existing buildings are altered, the requirements for new buildings apply with respect to new construction incident to alterations.

Minimum requirements are given in all cases; better construction should be used where circumstances permit.

Building Construction.

2411. The following requirements shall govern types of construction and limit their heights. (See §§20-42 for definitions.)

2412. In determining the height of buildings for the purpose of this section of the Code the basement shall be considered as a story if the floor of the principal story ("first floor") is more than 8 ft., 6 inches above grade level at any point next to the building. Service and entrance areaways encompassing not more than 10 per cent of the perimeter of the building may be omitted from the determining grade level.

2414. Fire-resistive construction is recommended for all buildings, and shall be used throughout for all buildings two stories or more in height.

NOTE. Fire resistive construction in which the least possible combustible material is used is highly recommended for hospitals and sanitariums.

2415. Masonry wall and wood joist construction shall not exceed one story in height; if floor areas exceed 5,000 sq. ft. they shall be divided by fire walls, or by fire partitions with at least 2 hours fire resistance rating so that the largest subdivision shall not exceed 5,000 sq. ft. The height of any window sill in patient rooms shall not exceed 72 inches above the grade immediately below it.

2416. Wood frame buildings shall not exceed one story in height; if floor areas exceed 5,000 sq. ft. they shall be divided by fire walls, or by fire partitions with at least 2 hours fire resistance rating, so that the largest subdivision shall not exceed 5,000 sq. ft. The height of any window sill in patient rooms shall not exceed 72 inches above the grade immediately below it.

2421. Wood stud walls, ceilings and partitions in buildings of combustible construction shall have at least 1 hour fire resistance rating.

2422. (a) In buildings of fire resistive construction the hazardous areas listed in §2422(d) shall be separated from other occupancies by a standard fire cut-off. (See Note page 90.)

NOTE: The degree of fire resistance of ceilings, partitions and doors required for cut-offs should be commensurate with the hazard involved. For example, kitchens provided with automatic extinguishing systems to control grease fires do not require cut-offs as do paint shops which contain concentrations of volatile materials in small areas.

(b) In buildings of nonfire-resistive construction, with floor area exceeding 3,000 square feet, the hazardous areas listed in §2422(d) shall be separated from the remainder of the building by a standard cut-off, or protected by an approved automatic sprinkler system.

(c) In buildings of nonfire-resistive construction of less than 3,000 square feet of floor area, the rooms or portions of the building listed in §2422(d) shall be isolated so far as may be feasible from the patient areas and, with the exception of heating apparatus and fuel storage, shall not be located in the basement.

(d) HAZARDOUS AREAS: Heating apparatus and boiler rooms, basements or attics used for the storage of combustible material, workrooms such as carpenter shops, paint shops and upholstery shops, central storerooms such as furniture, mattresses and miscellaneous storage, and similar occupancies intended to contain combustible materials which will either be easily ignited, burn with an intense flame or result in the production of dense smoke and fumes.

NOTE: The early discovery and extinguishment of fires in hazardous areas is more important to life safety than the confinement of such a fire to the area. It is therefore recommended that hazardous areas should be protected by an approved automatic fire detection system or an automatic sprinkler system.

The need for automatic protection of any individual room or space will depend on its size and degree of combustibility of the contents. The location of rooms is also an important factor. Rooms of hazardous occupancy located in the basement may require automatic protection for the safety of the occupants of the building, while similar rooms and hazards located in a roof house could burn out without causing any immediate danger to the occupants of the floors below.

Automatic sprinkler and automatic fire detection systems require regular supervision, tests, and maintenance to assure that they will be in proper operative condition in case of fire. The character of the supervision and maintenance available, the type of water supply and public fire department protection in the individual locality, the size and character of the building, and other local factors should be considered in determining the type of automatic protection to be required for any individual hospital building.

2423. Rooms used for the storage of nitro-cellulose X-Ray films shall be safeguarded in accordance with the Standards of the National Fire Protection Association for Photographic and X-Ray Nitro-cellulose Films.

ENCLOSURES.

2425. Every shaft for light or ventilation, stairways, elevators, dumbwaiters, chutes, etc., shall be continuously housed in enclosure walls as prescribed by Section 1, §§135 to 144 incl., and Section 7, §§705 to 708 and all openings thereto shall be protected by approved fire doors. Where glass is necessary, wired glass in fixed or automatic closing fire windows shall be employed. All fire doors, except those on shaft enclosures of elevators operated by a regular attendant, shall be self-closing.

NOTE. Light and air shafts are not recommended.

DIVISION OF STORIES

2426. (a) No more than 150 feet of corridor without barrier against the lateral passage of smoke shall be permitted, and the enforcing authority may order fire walls, or smoke barriers, or both, to be built in new or existing buildings where he finds that such fire walls or smoke barriers are necessary to reasonable safety of the occupants of the hospital.

NOTE: For definition of "smoke barriers" see §§2131, 2132, 2133.

(b) Each story in which 35 or more patients are housed shall be divided into at least two compartments by smoke barriers, and the enforcing authority may require stories housing a lesser number of patients to be divided into compartments when, in his judgment, such division is essential to the protection of the patients.

NOTE: Central elevator lobbies, where feasible, should be divided from patient areas by smoke barriers.

(c) Doors in smoke barriers shall be so installed that they may normally be kept in open position, but will close automatically or may be released manually to self-closing action. Corridor door openings in smoke barriers shall be not less than 44 inches in width.

NOTE: In the planning of hospital exits it is essential that arrangements are made to facilitate the transfer of patients in their beds from one section of a floor housing patients to another section of the same floor separated by a fire wall or smoke barrier. The value of the general principle of horizontal exits (see Section 4) by dividing areas in which patients are housed into at least two compartments separated by a smoke barrier equipped with self-closing doors is thus recognized. Where the building design will permit, the section of the corridor containing an elevator lobby should be separated from corridors leading from it by smoke barriers. Such an arrangement, where elevators are 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 may be evacuated because of threatening smoke and fire.

Number and Character of Exits.

2431. Exits shall be so placed that the entrance door of every private room and every point in open wards, day rooms, dormitories and dining rooms shall be not more than 100 feet (along the line of travel) from the nearest exit; in buildings equipped with automatic sprinklers in accordance with §2463 this distance may be 150 feet. Exits shall be remote from each other and shall be so arranged with regard to floors that there are no pockets or dead ends of appreciable size in which occupants may be trapped.

NOTE: Requirements for exits and smoke barriers (§2426) should not be confused. Exit enclosures are designed to protect against the horizontal and vertical passage of fire, smoke and hot gases. Smoke barriers are designed to protect against the horizontal passage of smoke.

Many hospital authorities advise against the placing of an exit at the extreme end of a hospital wing occupied by operating or delivery rooms for the reason that this arrangement can be a source of contamination from air-borne bacteria. Hospital operating rooms and

delivery rooms should be so located that through traffic cannot pass them.

The enforcing authority should be given discretionary authority to permit the use of an interior stairway in a wing containing operating rooms or delivery rooms in such a manner that there will be no traffic past the doors of operating rooms or delivery rooms located in the area, but which will provide adequate exits for patient bedrooms adjoining such facilities.

2432. Exits shall be of the following types:
(a) Horizontal exits.
(b) Doors leading directly outside the building (without stairs).
(c) Ramps.
(d) Stairways.

Not less than two exits (and more when required by §2451) of one or more of the above types shall be provided for every floor (including basement) of every building or section. At least one exit in each section shall be of type (b), (c) or (d).

NOTE. Other types of exits are recognized in special cases by subsequent paragraphs.

2433. Buildings in which portions over 3000 square feet area are used for bedridden patients shall have within 100 feet of any point in the area, or within 150 feet in sprinkled buildings, at least one door leading directly to the ground level outside the building, to a horizontal exit (see Section 5), or to an enclosed ramp.

2434. (a) All required stairs, horizontal exits, ramps, and other exits in new buildings which serve as egress from hospital and infirmary sections shall be not less than 44 in. in clear width, including entrance doors and corridors in connection therewith, to permit the transportation of patients on beds, cots, litters, or mattresses, from one story or section to another.

(b) Doors to interior stairways used as exits shall not open immediately on a flight of stairs but on a landing arranged in such a manner that not less than 22 inches clearance between newel posts and doors in any open position will be maintained.

(c) Where there are other changes in the direction of the line of egress as on a stair landing, ample space should be provided to permit making turns.

Exit Details.

2441. Exit capacity as specified by §§2451-2453 shall be secured by providing standard egress facilities in accordance with the several sections of Part A applied and modified in accordance with §2442-§2449. (See also §2433 and §2434):

STAIRWAYS.

2442. Stairs and stairway enclosures shall be in accordance with Section 1. Stairs shall be Class A or Class B for new buildings, and may be Class C for existing buildings (subject to the reductions for substandard stairs specified by §134). Winders are prohibited in all required stairs for both new and existing construction.

All required stairs in new buildings preferably should be located adjacent to exterior walls and shall have direct outside exit at grade.

RAMPS.

2443. Wherever stairs are specified in this section, ramps in accordance with Section 3 may be substituted.

HORIZONTAL EXITS.

2444. Horizontal Exits shall be in accordance with Section 4.

DOORS.

2445. Doors shall be in accordance with Section 5 (see also §2434). Sliding doors are permitted on elevator shafts and in connection with horizontal exits. Revolving doors are permitted on main entrance doorways not serving as required exits for sections occupied by patients subject to restrictions of §§510-511.

2445A. By special permission of the enforcing authority, doors on stair enclosures may be kept normally open, if provided with fusible link holds or equivalent devices, and also provided with friction devices of a type that may be readily disengaged, so arranged that the doors will be released by heat, or may be readily released manually. Where doors are kept normally open in accordance with such permission adequate provision shall be made through the alarm system or through fire drills to assure their prompt closing in case of fire.

AISLES AND CORRIDORS

2446. Aisles and corridors shall be in accordance with Section 6, and where conditions of egress require the passage of beds shall be not less than 96 inches in width.

ELEVATORS.

2447. Elevators should be in accordance with Section 7, but are not counted as required means of egress when serving institutional buildings.

FIRE ESCAPE STAIRS.

2448. Fire escapes shall not constitute required means of egress for new buildings. (On existing buildings Class A fire escape stairs in accordance with Section 2 are permitted by §2491).

SLIDE ESCAPES.

2449. Slide escapes (Section 9) shall not constitute required exits on hospital and sanitarium buildings (except as their use as required exits is permitted by § 2491 on existing buildings).

NOTE: Slide escapes are a valuable auxiliary to the required exits for institutions housing patients not able to walk but whose physical condition is such that the use of a slide escape would have no injurious effects (e.g., a person without legs but otherwise in normal health).

Rules for Determining Required Exits.

2451. STAIRS FROM UPPER STORIES. For floors above the first or street floor, stairways (or ramps, see Section 3 and §2433); or where specifically permitted for existing buildings only, Fire Escape Stairs, §2448, or slide escapes (§2449), shall be provided in accordance with the preceding general requirements, as follows:

For buildings where the maximum occupancy is not over 1 person per 150 square feet gross floor area

$$\text{Number Units exit width} = \frac{\text{Gross Area per floor (square feet).}}{150 \times 30}$$

(150 square feet per person, 30 persons per exit unit as per §2013.)

For buildings where the maximum occupancy is over 1 person per 150 square feet gross floor area

$$\text{Number Units exit width} = \frac{\text{Maximum number persons per floor.}}{30}$$

NOTE: Buildings used for hospital purposes will seldom be found with population greater than 1 person per 150 square feet floor area. Institutional buildings other than hospitals may be found more densely occupied, in which case the egress facilities must be proportionately increased.

The above does not modify the requirement for two exits from every area, even though in small buildings the formula gives a smaller result. See §2013 and §2013A for basic rules on occupancy of buildings, from which the above is derived.

2452. BASEMENT EXITS. The basement (or "ground story") shall be treated the same as an upper story in accordance with §2451, and exits shall be provided accordingly, either stairs leading to the first story or doors leading directly outdoors.

2453. First floor doors shall be provided as follows:

(a) One unit of door width for each unit of stairs from upper floors.

(b) One additional unit of door width for each unit of required stairs from basement.

(c) One additional unit of door width for each 50 persons or fraction thereof allowed on the first floor.

Alarms and Drills.

2461. (a) Manually operated fire alarm systems shall be provided for hospitals and sanitariums which sound an audible alarm in departmental offices, the engineering office, fire brigade headquarters, nurses' quarters, and such other central locations where gongs, sirens, whistles or bells will not disturb patients. Distinctive visual or audible alarms shall be installed at each nurses' station and used for fire alarm purposes only (see also Section 10).

NOTE. Alarm sending stations should be so located as to be readily available in all portions of the premises, to the end that when a fire is discovered by any one who is qualified to send an alarm, he may reach a station from which aid may be summoned without being required to leave the zone of his ordinary activities or to pass out of the sight and hearing of those immediately exposed by or in direct view of the fire. The operation of an alarm sending station should automatically act to summon aid of all attendants who can properly be spared from their usual wards or areas for the purpose of assisting in the removal of physically helpless occupants and in controlling mentally incompetent occupants. The aid so summoned should also include an adequately manned and equipped municipal fire department, if such a department is so situated as to assure prompt arrival. Otherwise, there should be an adequate local or private fire brigade, which will be summoned.

(b) Every hospital shall be equipped with an approved fire alerting system suitable for alerting all persons charged with duties for patient care and all employees of the hospital who are within the building. The fire alerting system shall be capable of being operated from the telephone switchboard and the administrative office.

(c) Hospitals should be patrolled at not less than hourly intervals, the person charged with this responsibility visiting all parts of the premises not under continuous observation by persons charged with duties for patient care, including stairways, passageways, corridors, exit doorways, closets, attics, etc., to maintain exits, exit lighting, and fire protection equipment in working order and who shall cause an immediate alarm to be transmitted in case of fire or suspicion of fire, such as smoke or excessive heat in any part of the building.

(d) In all hospitals, the owner shall designate sufficient personnel, providing twenty-four hour coverage, charged with specific responsibility for taking effective action in case of fire and for immediately notifying the fire department as soon as any fire is suspected or discovered.

2462. Fire exit drills shall be conducted in accordance with Section 11. (See §1150-1164).

Fire Extinguishing Equipment.

2463. Fire extinguishing equipment required by this code shall be of an approved type installed and maintained in accordance with the standards governing the same recommended by the National Fire Protection Association (see §14).

Sprinkler Systems shall be in accordance with the Standards for Automatic Sprinkler Equipments.

Standpipes and hose shall be in accordance with the Standards for Standpipe and Hose Systems.

Extinguishers, fire pails, etc., shall be in accordance with the Standards for First Aid Fire Appliances.

2464. (a) All buildings exceeding two stories or 35 ft. in height shall be provided with standpipes and hose.

(b) All buildings shall be provided with fire extinguishers distributed and installed in accordance with the Standards for First Aid Fire Appliances. (See §2463).

Signs and Lighting.

2465. Auditoriums, assembly rooms, large wards, stairways, exits and exitways shall have illumination and signs in accordance with the requirements of Section 12, and the following:

2466. Artificial lighting of one foot candle intensity shall be provided in all stairways and exits and in the passageways appurtenant thereto, shall be supplied preferably from an independent source or from a connection extending back to the main service entrance for the building so that failure of room lighting from internal causes will not affect the exit and emergency light. In case of unusual danger which may exist on account of type of building, nature of the work, crowded conditions or lack of suitable exit space, an independent service shall be insured by connecting to a separate source of supply without or within the building.

After dark if more than fifty persons are gathered in rooms having an illumination less than one-tenth of a foot candle the exits from rooms and all passages to the exits of the building shall be indicated by adequately illuminated exit signs so as to clearly indicate the path of safe exit from the building in case of emergency.

Auditoriums and Amusement Halls.

2471. Auditoriums, chapels, and similar places of general assembly, including motion picture and dining halls, shall be provided with exits in general conformity with those specified for other parts of the building. Where used for 200 or more persons, exits shall comply with Section 25 of this code.

Where exits from auditoriums or other places of general assembly lead through corridors or stairways also serving other parts of the building the same exits may serve both sections except where auditoriums are designed for general public assembly in which case independent exits shall be provided.

2472. Motion picture booths and film storage should be installed and maintained in accordance with the standards of the National Board of Fire Underwriters as recommended by the National Fire Protection Association.

Boiler Rooms.

2473. Rooms containing high pressure boilers, refrigerating machinery transformers or other service equipment subject to possible explosion should not be located directly under or adjacent to exits. All such rooms shall be effectively cut off from other parts of the building, and shall be provided with adequate vents to the outer air.

Air Conditioning.

2474. All air conditioning installations shall comply with the N.F.P.A. standards on this subject. (See §14.)

EXISTING HOSPITAL BUILDINGS.

2481. Existing buildings shall be made to conform to the preceding requirements except in so far as these provisions are specifically waived by §§2482-2491. It is recommended that existing buildings be made to conform to the foregoing requirements as far as possible. The following requirements for existing buildings afford a minimum degree of safety for such buildings. Each building should be taken as a special case to be considered on its own merits. In general it will be found that the installation of automatic sprinklers will be the most satisfactory method of compensating for construction deficiencies in existing hospital and institutional buildings.

Building Construction and Height.

2482. Existing buildings not complying with the requirements for new buildings, may be occupied under the conditions set forth in the following paragraphs. For the purposes of this section the terms used shall be defined as follows:

OCCUPIED shall mean used for living, sleeping or working quarters for patients or charges.

AUTOMATIC SPRINKLER PROTECTION shall mean a single supply automatic sprinkler system (see §2463) protecting the *entire building* (including attics and all concealed and inaccessible spaces).

2483 (a) Existing wood frame buildings which do not meet the requirements of §2422 (b) or (c) and §2425, the areas of which do not exceed 7,500 square feet, may be occupied in the two lower stories (but not in basements) when provided with automatic sprinkler protection as defined in §2482 and vertical openings are protected, and stairways are enclosed with at least Type 5 Enclosures (wired glass in metal framework—see §146). (Waives §2416.)

(b) Existing buildings of masonry wall and wood joist or heavy timber construction which do not meet the requirements of §2422 (b) or (c) and §2425 may be occupied in the three lower stories (but not in basements) when all vertical openings are protected and stairways are enclosed with at least Type 5 Enclosures (wired glass in metal frames—see §146), and the building is equipped with automatic sprinklers as defined in §2482, and in four stories when, in addition, walls, ceilings and partitions have a minimum fire resistance rating of 1 hour. (Waives §2415.)

(c) Existing buildings of fire resistive construction which do not meet the requirements of §2422 (a) and §2425 for new buildings, may be occupied in the 8 lower stories when all vertical openings are protected and stairways are enclosed with at least Type 5 Enclosures (wired glass in metal frame work—see §146). Occupancy of existing fire resistive buildings shall be limited to 4 stories unless hazardous areas listed in §2422 (d) are protected by an approved automatic sprinkler system. (Waives §2414.)

2485. The finish requirements of §2421 may be waived for existing buildings.

2486. In lieu of fire-resistive construction with standard fire doors [illegible]y §2422 for rooms of hazardous occupancy the following con- may be permitted:

[illegible]ms or sections shall be enclosed in fire-stopped wood stud parti- [illegible]ouble wooden floors on fire-stopped joists and protected in each [illegible]hereof by metal lath and ¾ inch gypsum or cement plaster. Doors communicating with other portions of the building shall be self-closing not less than 1¾ inches thick, of solid, flush construction and metal clad on the hazardous side.

Enclosures.

2487. Where conditions make it impracticable to provide enclosures for vertical openings as required by §2425, such enclosures may be omitted if

(a) A complete automatic sprinkler system (see §2463 and §2482) is installed.

(b) Requirements of §2483 are not interfered with.

Exits.

2488. Stairways and other exits shall be the same in existing buildings as hereinbefore specified for new buildings except as follows:

2489. Stairways may be used as required exits in buildings used for bedridden patients (requirements of §2433 waived).

2490. (a) Exit width for hospital and infirmary section shall be not less than 40 inches, instead of 44 inches as specified in §2434.

(b) For existing buildings the required width of aisles and corridors shall be 60 inches instead of 96 inches as prescribed in §2446.

2491. If existing exits are insufficient according to the rules herein (see §2451), required additional exit capacity shall be obtained by adding:

(a) Horizontal exits or doors directly outside.

(b) Stairways or ramps.

(c) Class A. Fire Escape Stairs (see Section 2) not less than 48 inches wide. (See §2448.)

NOTE. Straight run stairs are preferred.

(d) Enclosed slide escapes (see Section 9).

Section 25.

PLACES OF PUBLIC ASSEMBLY.

Introduction.

2501. The purpose of this section of the Code is to specify exits and exit facilities in the proper number and arrangement so that places of public assembly may be emptied promptly in case of fire, smoke or panic without undue danger to life. Its provisions shall be applied to all places of assembly.

2502. This section does not in general give the details of stairway construction and other engineering standards but makes reference to Part A for such features, covering in detail here only features where variations from the general standards apply to buildings used as places of public assembly. In cases where there are differences between this section and the general provisions of other sections of the Code, the provisions of this section take precedence for this class of occupancy. Reference is made to Section 20 for the general requirements for facilities for exit.

Definitions.

2511. The terms relating to the type or class of building construction or regulations shall be as defined in the Introduction of this Code, §20 to §42.

2512. PLACE OF PUBLIC ASSEMBLY. The term Place of Public Assembly shall include every place used for the congregation or gathering of 200 or more persons in one room whether such gathering be of a public, restricted or private nature. Assembly halls, churches, school auditoriums, auditoriums, recreation halls, or pavilions, places of amusement, dance halls, opera houses, motion picture theatres and theatres are included within this term.

Theatres and motion picture theatres shall be classed as places of public assembly even though their capacity is less than 200.

2513. BALCONY. The term balcony shall mean the first seating tier above the main floor and within the place of assembly.

2514. GALLERY. The term gallery shall mean any seating tier of a place of assembly above the balcony.

2515. LOBBY. The lobby is an enclosed vestibule between the principal entrance to the building and the door or doors to the main floor of the room for assembly.

2516. MAIN FLOOR. The term main floor shall mean the first or principal tier within a room used for public assembly.

2517. PROSCENIUM WALL. The proscenium wall is the wall dividing the stage and scenery space from the seating space.

2518. CAPACITY. The number of persons assembled, as determined by §2013A.

2519. GRADE. For the purposes of this section the grade shall be the level of an outside walkway, street, yard, court, the ground or a terrace, as hereinafter limited, when serving as the way of approach to or de-

parture from the principal doorway serving places of assembly. The point for measuring the level of the grade shall be the surface of the way of approach or departure adjacent to and opposite the center of the doorway. An outside terrace may be considered as determining the grade when its width is not less than 10 feet as measured along the line of exit travel, and the area of the walkway surface is not less than one tenth of the area of the assembly rooms served.

2520. FLOOR LEVEL. In case of sloping floors the determining elevation shall be the height of the threshold of the principal exit door.

Building Construction—General.

2521. This Code specifies minimum requirements; better facilities and constructions should be provided where circumstances permit. The provisions apply to new and existing buildings; for existing buildings, however, certain of the requirements are different from those for new buildings.

2522. Buildings and rooms for public assembly shall have ample and unrestricted access to public ways of approach on one or more sides, at least one of which ways shall be a public road or street. Assembly halls, theatres and places of recreation and amusement having a capacity of 1000 or more persons shall have access to two ways and if of a capacity of 2000 or more persons both of such ways shall be public ways or open yards to public ways. The aggregate width of exits shall not exceed 80 per cent of the width of public ways into which they discharge. (See also §110.)

NOTE. It is important that ample roadways be available from buildings in which there are large assemblies 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.

2523. The height of the sills of the principal entrance doors to buildings housing places of public assembly having capacities of 500 or more persons shall not be more than 21 inches above the grade, walk or terrace level in climates where there is a possibility of accumulations of ice or snow and in no climate shall the height above the grade, walk or terrace level be more than five feet. Terraces between the entrance doors of such places and walks, if more than three feet above the walk level, shall be not less than 10 feet wide and shall have an area of not less than one-half square foot for each person accommodated in the place or places of assembly if such terrace level is considered as determining the grade. The terrace level shall be not more than 21 inches below the level of the entrance door. See also §§151-153.

NOTE. Wherever possible, entrances should be at the grade level without steps or should have ramps to grade. Where it is not possible to have ramps there should be hand rails not over 66 inches apart for the steps or there should be canopies as protection from the weather.

Limits of Area.

2531. Places of public assembly with floors not to exceed 21 inches from grade level shall not be limited as to area except that the total length of travel from any point to an exit shall not exceed 150 feet. If the travel distance from any seat to an exit exceeds 100 feet there shall be no intervening enclosed passageway, corridor or tunnel. At least half of the doors shall open directly into streets, alleys, open courts or yards or into open arcades, the other half may open through lobbies or wide vestibules.

In places of assembly devoted primarily to other occupancies, such as schools, ground floor egress path may be across corridors or lobbies.

2532. A place of public assembly more than 40 feet above grade shall be permitted in a fire resistive building only, and if 80 feet or more above grade its floor area shall be limited to 7500 square feet.

2533. In buildings of non-fire-resistive construction rooms for public assembly shall not be placed with principal entrance doors at greater height than 28 feet above grade except when provided with an exit stair or ramp in a smokeproof tower in accordance with §§137-141 except that the walls of the smokeproof tower may be of the same type of construction as for an inside stairway enclosure (§2552), or in the case of an existing building it may have a Class A fire escape stairs arranged in accordance with §205a. A place of public assembly in a building of non-fire-resistive construction may not have any part of its floor more than 12 feet below grade, nor more than 40 feet above grade, and if in a fire resistive building may not have any part of its floor more than 20 feet below grade.

Exits, Location and Distribution.

2541. Exits shall be provided not less than the following:

(a) BUILDINGS USED FOR GENERAL ASSEMBLY PURPOSES, including exhibition buildings, dance halls and other places of assembly where seating arrangements are not used, and also applying to club and similar buildings containing a number of small assembly rooms where seats may be used. (Where seating arrangements are used, as in theatres and auditoriums, a larger exit capacity is required by paragraph (b)).

Street floor—One unit of exit width for each 1500 square feet gross floor area, plus any doors required to serve stairs from other floors that discharge through the street floor area.

Other floors—One unit of exit width for each 450 square feet gross area per floor (same stairway may serve a number of floors; additional width not required for additional floors).

(b) THEATRES, AUDITORIUMS AND OTHER BUILDINGS WHERE SEATING ARRANGEMENTS ARE USED.

Auditorium floor—One unit of exit width for each 600 square feet of net floor area of the auditorium or room used for seating, including aisles but excluding foyers, lobbies, toilets and the utility rooms.

Balconies or galleries—One unit of exit width for each 600 square feet of net floor area. (If a stairway serves more than one balcony or gallery it must be increased in width in accordance with the area served.)

Where lobby and other spaces are large in proportion to the auditorium, the exits should be checked to see that the requirements of (a) above are met for the building as a whole.

(c) TWO OR MORE AUDITORIUMS IN SAME BUILDING.

The entire building shall meet the requirements of (a).

Each auditorium, considered separately, shall meet the requirements of (b).

NOTE: The above is based on §2013 and §2013A.

The exits for general assembly buildings are based on an occupancy of one person per 15 square feet gross floor area; where a larger number is to be accommodated, the exits must be increased proportionately.

The exits for theatres and auditoriums are based on an occupancy of one person per 6 square feet of net floor area. This figure makes some allowance for persons occupying standing space. The practice of allowing persons to stand near exits, however, should be discouraged if not prohibited altogether. The utilization of standing space within theatres or motion picture theatre auditoriums should be prohibited. (See §2574.)

2542. Every place of public assembly, and every floor balcony or tier thereof considered separately, shall be provided with at least two exits, as remote from each other as practicable. Where more than 600 persons are accommodated there shall be at least three, and where more than 1,000 persons are accommodated there shall be at least four exits. The number of persons shall be taken at not less than one per 6 square feet net floor area used for seating, and not less than one person per 15 square feet gross area of spaces not used for seating. (See §2013A.)

2543. EXAMPLE. An auditorium has a net floor area of 18,000 square feet. The principal entrance doors are not more than 21 inches above grade. All entrances and exits have ramps to grade.

$$\text{Number units exit width required (As per §2541b)} = \frac{18{,}000}{600} = 30$$

This may be secured by providing 15, 40-inch doors, or equivalent.

Number of persons accommodated in this auditorium (§2542) is 18,000 ÷ 6 = 3000. Therefore the required door capacity must be distributed at four (or more) different points, suitably located so that no seat is more than 150 ft. from an exit measured along the path of travel (§2563).

2544. The principal exit ways from any balcony or gallery should be so located that it will be necessary to ascend not more than 10 feet or descend not more than 6 feet to reach an exit door leading to the stair or an area of refuge. Where exit ways to serve this purpose are required on more than one level they should be placed at vertical distances of not more than 12 feet apart.

Exit Details.

2551. The required exits specified herein shall provide free and unobstructed access to the street or other place of safety. The stairs, doors or other exit facilities used shall comply with the following:

2552. STAIRWAYS. Stairs for places of public assembly shall be Class A (§120-§125) with enclosures of not less fire resistance than Type 3 (§144) except that in buildings of frame or of ordinary construction where the floor is not to exceed 21 feet above grade and in existing buildings where the floor is not to exceed 28 feet above grade the stair may be of Class B (§126-§130) and the enclosure may be Type 4 (§145).

2553. Stairs from a balcony, boxes or loges, the vertical height of which does not exceed 18 feet may be open. Stairs from balconies shall be

considered as enclosed when separated from all rooms and all spaces above the main floor by walls conforming to the requirements for stairway enclosures and having the lowest flight open to a public lobby on the main floor when the public lobby is separated from the main assembly room by self-closing fire doors or smoke-resistive doors.

NOTE. By a smoke-resistive door is meant a light door of metal, or metal covered, or other approved type with or without wired glass panels.

2555. Stairways from balconies, galleries, boxes or loges, discharging through a public lobby shall discharge in a direction parallel to and with the exit travel from the main assembly floor or shall have a rail separating the lines of travel.

Not more than two-thirds of the total exit capacity from any place of public assembly, or from any balcony or tier thereof, shall be through a single public lobby.

2556. FIRE ESCAPE STAIRS. Class A fire escape stairs conforming to Section 2 may be used only on existing buildings subject to the limitations of §201.

2557. RAMPS. Ramps serving as means of exit from places of public assembly shall conform to the requirements for Class A or Class B. (See Section 3.)

2558. HORIZONTAL EXITS. To receive credit as required exits from places of public assembly horizontal exits shall be in accordance with the requirements of Section 4.

2559. DOORS. Exit doors shall be in accordance with Section 5. Doors requiring glass panels shall have wired glass only. Revolving doors shall not constitute any part of required means of egress.

2560. Doors in places of assembly having a capacity in excess of 500 persons shall be equipped with panic hardware in accordance with §512.

2561. SLIDE ESCAPES. Slide escapes shall not be used on places of public assembly except that they may be used for one of the required means of exit from fly galleries, paint bridge, grid or loft of a theatre stage. (For requirements see Section 9.)

2562. AISLES. Aisles shall be in accordance with Section 6, except that when not to exceed 60 seats are to be served by an aisle its width may be not less than 30 inches. Steps shall not be placed in aisles to overcome differences in level unless the gradient shall exceed one foot rise in 10 feet of run. Steps in aisles shall conform to the requirements for Class A stairs (§122) as to rise and tread except that in galleries the rise and tread may conform with Class B (§128). The risers of steps in aisles, where practicable, shall be uniform in height for any floor or tier. The gradient of sloping aisles should not exceed one foot rise in 10 feet of run.

2563. The line of travel to an exit door by any aisle shall be not greater than 150 feet. Not more than 20 transverse rows of seats shall be placed between cross aisles. Not more than 10 rows of seats nor 12 feet of rise may be placed between cross aisles where steps are provided in the main aisles to overcome differences in level. Cross aisles shall be not less than 44 inches wide, unless railed away from the seats fronting thereon. If so railed the width shall not be less than three feet.

2564. CORRIDORS. Corridors shall be in accordance with Section 6 and shall lead as directly as possible to exit doors. Corridors shall not be less than 44 in. in width and shall be equal to or greater in width than any exit doors leading into them and not more than 15 per cent wider than exit doors to which they lead.

2565. ELEVATORS should be in accordance with Section 7, but are not counted as required means of egress when serving places of assembly.

2566. MOVING STAIRWAYS. Places of public assembly 12 feet or more above grade may have moving stairways counted as required means of egress when conforming with Section 8. Such moving stairways shall lead directly to the level of the exit doors and shall discharge into a space not subject to interference by exit travel from other exit ways.

2567. Except as provided in Par. 2553, all stairways, elevator shafts and other vertical openings shall be protected by enclosures not less than the following:

For new buildings—Enclosures Nos. 1, 2 or 3. (See § 135-144.)
For Existing Building—Enclosure No. 4. (See § 145.)
EXCEPTIONS:
Ornamental stairs as permitted in §136.

Seating.

2571. Seats in places of public assembly seating more than 200 persons shall be securely fastened to the floor. All seats in balconies and galleries shall be securely fastened to the floor, except that in railed-in enclosures, boxes or loges with level floors and having not more than 14 seats they need not be fastened.

2571(a). Chairs not secured to the floor may be permitted in restaurants, night clubs and similar 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. of floor area and adequate aisles to reach exits shall be maintained at all times.

NOTE.—If at any time the enforcing authority finds that the above conditions are not maintained, it will be appropriate to require that chairs be fastened to the floor even though this may interfere with the normal operation of the establishment.

2572. Rows of seats between aisles shall have not more than 14 seats. Rows of seats opening on to an aisle at one end only shall have not more than 7 seats. Seats without dividing arms shall have their capacity determined by allowing 18 inches per person.

2573. The spacing of rows of seats from back to back shall be not less than 30 inches, nor less than 27 inches plus the sum of the thickness of the back and inclination of the back. There shall be a space of not less than 12 inches between the back of one seat and the front of the seat immediately behind it as measured between plumb lines.

Waiting Space.

2574. In theatres and similar places of public assembly where persons are admitted to the building at times when seats are not available for them and are allowed to wait in a lobby or similar space until seats 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