



VIRGINIA FIRE SAFETY REGULATIONS

Adopted April 12, 1949
by the
STATE CORPORATION COMMISSION

Adopting agency amended 1981:

***Adopted by the State
BOARD OF HOUSING AND COMMUNITY DEVELOPMENT
Effective July 16, 1982***

INTRODUCTION

Maintenance Requirements for Existing Buildings

According to Virginia's building and fire codes, an existing building is required to be maintained in accordance with the building code that was in effect at the time the building was constructed and with the requirements of any applicable maintenance provisions of Virginia's fire code. This means that many conditions identified in an older building that may not be in full compliance with today's codes are acceptable because these conditions were okay at the time the building was constructed. As long as the use of the building is not changed, the building owner is not legally required to retrofit the building to meet the current code.

For example, a room used for spray application of flammable finishes that has been in use since before 1973 is not sprinklered. Because the code that was in effect at the time the building was built did not require a paint spray room to be sprinklered, the condition is allowed to continue even though the currently applicable fire prevention code requires sprinklers in this situation (F1504.6). Yet the room is still required to meet other fire prevention code requirements. For example, the space must be kept free of accumulated residues and solvent soaked rags must be disposed of in metal cans (F1503.4).

Determination of Maintenance Requirements

Many buildings in the State are required by law to be inspected by a fire marshal on an annual basis. In order for the inspection to be performed properly, the inspector should know the applicable codes. While the maintenance requirements are readily available in the current edition of the Virginia Statewide Fire Prevention Code, it is not quite as easy to find the requirements that were in effect at the time the building was built. Only through research of the history of Virginia's building codes can that information be gathered. In attempt to facilitate this research procedure, the following printing of the first building code enforced in Virginia is provided.

Research begins with the determination of the year the building was built and what the building was used for at that time. This information is provided on the Certificate of Occupancy (CO) of the building in question. The Office of the Building Official in the county, town or city that the building is located should have copy of the Certificate of Occupancy (CO) available upon request. If a CO is not available, one must use other means to determine the year of construction, its original use and any change of use that may have occurred over the years. Once the year is known, the exact code requirements can be determined by researching the history of Virginia's building codes.

If the building was built before 1973, a locally enforced building code may also be applicable. This information should be available at the local code enforcement office.

If the building is used as a hotel, nursing home, adult care facility, or a state owned dorm, retrofit requirements for fire sprinkler or smoke detection may also apply. Retrofit requirements adopted by Virginia can be found in the current edition of the Uniform Statewide Building Code, Part I, Article 3.

History of Virginia's Building and Maintenance Codes

The Virginia Fire Safety Regulations is the first statewide applied building code to be adopted in Virginia. It was adopted April 12, 1949. The enabling law was the Virginia Fire Hazards Law (see Appendix A of this printing). This law was renamed in 1981 the Virginia Public Building Safety Law, thus the Regulations were also renamed the Virginia Public Building Safety Regulations (VPBSR). Therefore the proper legal title for these regulations is the VPBSR.

When originally adopted, these regulations listed retrofit requirements applicable to buildings built prior to the code's adoption in 1949 and requirements for new construction. Between 1949 and 1981, the VPBSR was the applicable maintenance code (fire prevention code) used during fire marshal inspections.

In 1973, § 36-98 Code of Virginia became effective directing the promulgation of the Uniform Statewide Building Code (USBC). The USBC superseded the VPBSR as applicable to new construction. At that time, the VPBSR became a maintenance code only. In 1981, the law was amended to require buildings built after USBC was in effect to be maintained in accordance with the fire safety requirements listed in the USBC. This means the VPBSR is now used only as a maintenance code for buildings built before 1973.

When the Fire Hazards Law was repealed in 1986 and replaced with § 27-30 through 27-101, the Virginia Statewide Fire Prevention Code (VSFPC) was adopted. The new fire prevention code replaced the VPBSR as the applicable maintenance code for all buildings in the State. At that point on, the VPBSR is used only to clarify the construction requirements in effect at the time a building is constructed.

A summary of the history of the Virginia Public Building Safety Regulations is provided in Addendum E.

The following reprints of the Prefaces included in various printings of the Regulations provide additional documentation of the history of the code's application and the changes that took place over the years.

1953 Printing;

INFORMATION FOR USERS OF THIS CODE

THIS CODE IS ARRANGED in two parts. Part One consists of Articles 1 through 7 and applies to buildings erected after April 12, 1949. Part Two applies to buildings erected before April 12, 1949, and consists of Articles 11 through 17.

June 1977 Printing;

INFORMATION FOR USERS OF THIS CODE

THIS CODE IS ARRANGED in two parts. Part One consists of Articles 1 through 7 and applies to buildings erected after April 12, 1949, and prior to the effective date of the Uniform Statewide Building Code. In general, buildings for which plans were completed and the building permit issued after September 1, 1973, are subject to the requirements of the Uniform Statewide Building Code. Part Two applies to buildings erected before April 12, 1949, and consists of Articles 11 through 17.

1981 Edition (effective JULY 16, 1982);

PREFACE

Changes in the 1981 Edition

The 1981 Edition reflects certain changes: (1) because the Virginia Fire Safety Law was renamed the Virginia Public Building Safety Law, the name of the Virginia Fire Safety Regulations was changed to the Virginia Public Building Safety Regulations; (2) PART THREE has been added to cover the duties assigned by law to the State Fire Marshal for maintenance of fire safety in public buildings constructed under the Uniform Statewide Building Code (USBC). For such buildings the fire safety requirements of the USBC are adopted by reference.

Coordination with Local Building Officials

Plans Review: When requested by the local building official, the State Fire Marshal will review plans for construction or alteration of public buildings. An advisory report of any items that do not meet the applicable fire safety

requirements will be reported to the building official. The State Fire Marshal also reviews all plans for State-owned buildings.

Inspections: Possible violations of the fire safety requirements of the USBC that are discovered during routine inspections by the State Fire Marshal are discussed with the local building official to make certain that both agencies agree on the proper application of the code. The items on which both agree will be cited in Fire Marshal's report.

Correction of Violations: When construction work is needed to correct fire safety violations, the person responsible is advised that a building permit must be obtained from the local building official. Also, such changes must be done in a manner that does not create violations of the USBC.

Future Amendments

The Board of Housing and Community Development is responsible for keeping the Public Building Safety Regulations up to date. Comments or suggestions for amendments should be addressed to the Board of Housing and Community Development.

GUIDE TO MAJOR DIVISIONS OF THE 1981 EDITION VIRGINIA PUBLIC BUILDING SAFETY REGULATIONS

<i>PART ONE</i>	<i>Buildings Constructed Between April 12, 1949 and September 1, 1973</i>
<i>PART TWO</i>	<i>Buildings Constructed Before April 12, 1949</i>
<i>PART THREE</i>	<i>Buildings Subject to the Uniform Statewide Building Code, Beginning September 1, 1973</i>

2006 Printing

This printing is a reproduction of the 1953 text. The amendments are included in italicized text below the amended section headed with the date of the amendment. The original 1953 printing included Appendix A "Virginia Fire Hazards Law" and Appendix B "Fire Resistance Ratings". These two items were omitted in later printings. Appendix D "History of Virginia Public Building Safety Regulations" and Appendix E "Previous Adoptions and Amendments to USBC" were added in this printing.

History of the USBC

The USBC continues today as the new construction regulation for Virginia. The USBC incorporates by reference a model building code. At first, BOCA Building Code was the model code and later the International Building Code was referenced. The USBC has been revised approximately every three years since its original adoption in 1973 to incorporate the newest edition of the model code.

When establishing required maintenance provisions for an existing building built after 1973, one must determine the specific edition of the USBC and the incorporated model code edition based on the date of plans approval. This information can be taken from a list included in Addendum F.

1987 Edition of the Virginia Statewide Fire Prevention Code, Addendum 2

In the first edition of the Virginia Statewide Fire Prevention Code, printed in 1987, a reprint of the VPBSR was included in Addendum 2. In that printing, portions of the document were edited in a sincere attempt to clarify some of the more difficult concepts for the reader. Unfortunately, these changes were not processed through the legal channels. This means the information contained in the 1987 edition is not legally binding. Therefore, it is best not to refer to that printing for research purposes.

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BEGINNING SEPTEMBER 1, 1973***

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PART ONE

New Buildings

Revision 1981 Edition;

***Buildings Constructed Between
April 12, 1949 and September 1, 1973***

ARTICLE 1 - ADMINISTRATION

SECTION 100. SCOPE

100-1. Short Title

These regulations shall be known and may be cited as the "Virginia Fire Safety Regulations". Except as otherwise indicated, "Regulations" used herein shall mean "Virginia Fire Safety Regulations", "Law" used herein shall mean Chapter 493, Acts of Assembly, 1943, entitled "Virginia Fire Hazards Law," and "Commissions" shall mean "State Corporation Commission."

100-2. Application

- (a) These Regulations shall apply to all public buildings as defined by Chapter 493, Acts of Assembly, 1948, as amended by Chapter 605, Acts of Assembly, 1952, in which the term "public building" means and includes any building or structure, permanent or temporary, which is used or occupied, or to be used or occupied, by ten or more persons who are employed, lodged, housed, assembled, served, entertained or instructed therein and, without limiting the foregoing, includes hotels, schools and colleges, hospitals of all kinds, asylums, mercantile establishments, office buildings, apartment houses, theaters, restaurants, auditoriums, stadiums, gymnasiums, armories, dance halls, factories, work shops, lodges, meeting rooms, manufacturing and processing establishments, and all other buildings and structures of same or similar character or of same or similar use; including buildings owned and occupied by the State or by any of its political subdivisions; provided however, that in any city having a population according to the last official census of more than 200,000 people, no building or structure as aforesaid shall be included in the term "public building" as aforesaid, unless such building or structure as aforesaid is so used or occupied by 20 or more persons as aforesaid. Unless specifically noted, these Regulations shall not apply to 1, 2, or 3 family dwellings.
- (b) Unless otherwise noted, Articles 1, 2, 3, 4, 5, 6, and 7 (Part One) of these Regulations shall apply only to buildings hereafter erected or equipment hereafter installed, and Articles 11, 12, 13, 14, 15, 16, and 17 (Part Two) shall apply only to buildings heretofore erected or equipment heretofore installed.
- (c) Nothing in these Regulations shall be construed to lower in any way existing or future requirements of any political subdivision of the State respecting fire safety in public buildings.
- (d) Where a requirement of these Regulations is more restrictive than the corresponding requirement of any political subdivision, the requirement of these Regulations shall govern.
- (e) Any table of contents, index, appendix, or explanatory reference not accompanying or appearing in these Regulations shall not be considered a part of the Regulations.

100-3. Effective Dates

- (a) The effective date of any provision of these Regulations shall be 90 days from the date of its adoption in the case of buildings hereafter erected or equipment hereafter installed.

- (b) The effective date of any provision of these Regulations shall be one year from the date of its adoption in the case of existing buildings or equipment heretofore installed.
- (c) Buildings or equipment on which construction or installation has been commenced before a provision applying to buildings hereafter erected or equipment hereafter installed becomes effective shall not be required to conform to such provision, provided the work is completed within two years from the effective date. Such buildings and equipment shall, nevertheless, meet all provisions applying to existing buildings.
- (d) In any case of extreme hazard to life in an existing building the Commission may make any rule applicable thereto immediately effective and may give the owner thereof a reasonable time to comply with the rule.

(Note: The Virginia Fire Safety Regulations were adopted April 12, 1949.)

SECTION 101. ENFORCEMENT

101-1. General

These Regulations shall be enforced as prescribed by Chapter 493, Acts of Assembly, 1948.

(Note: See Appendix A, "Virginia Fire Hazards Law.")

101-2. Chief Fire Marshal

Subject to the supervision and direction of the State Corporation Commission, the Chief Fire Marshal shall be directly responsible for the proper exercise of the functions and for the performance of the duties of the Commission in connection with the enforcement of Chapter 493, Acts of Assembly, 1948, and of these Regulations.

101-3. Local Agencies

The powers and duties of local enforcement agencies respecting enforcement of these Regulations shall be as prescribed by law.

SECTION 102. MODIFICATION

102-1. When Regulations May Be Modified

Where the purpose of any provision of these Regulations, as it pertains to safety to life and property from fire, can be fulfilled by other means in the case of a specific building, the State Corporation Commission may modify the provision to permit certain specified alternatives.

January 15, 1979 Amendment;

102-1. When Regulations May Be Modified

Where the purpose of any provision of these Regulations, as it pertains to safety to life and property from fire, can be fulfilled by other means in the case of a specific building, the Chief Fire Marshal may modify the provision to permit certain specified alternatives.

102–2. Records

The application for modification and the final decision of the Chief Fire Marshal shall be in writing and shall be officially recorded in the permanent records of the Office of State Fire Marshal.

102–3. Appeal to Review Board

Any person aggrieved by a decision of the Chief Fire Marshal upon an application for a modification of the Regulations, whether or not a previous party to the decision, may apply for review to the State Building Code Technical Review Board. Application for review shall be made to the Review Board within 30 days of the filing of the Chief Fire Marshal's decision in the office of the Office of State Fire Marshal.

102–4. Court Review

An appeal from the Review Board shall be in accordance with the provisions of Sections 9-6.14:15 through 9-6.14:19 of the Code of Virginia (1950), as amended.

ARTICLE 2 - DEFINITIONS

SECTION 200. DEFINITIONS

- (a) Unless otherwise expressly stated, the following terms shall have the meanings indicated in this Section.
- (b) Words used in the present tense include the future; words in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural the singular.
- (c) Where terms are not defined in this Section they shall have their ordinarily accepted meanings or such as the context may imply.

“ALLEY” means any public space or thoroughfare 20 feet or less in width which has been dedicated or deeded for public use.

“ALTERATION”, as applied to a building or structure, means a change or rearrangement in the structural parts or in the exit facilities; or an enlargement, whether by extending on a side or by increasing in height; or the moving from one location or position to another. The term “ALTER”, in its various moods and tenses and its participial forms, refers to the making of an alteration.

“APARTMENT” means a room, or a suite of two or more rooms, in a Group C building occupied as the home or residence of an individual, family or household.

“APARTMENT HOUSE” means a building in which three or more apartments are located. Rooming houses are considered to be apartment houses.

“APPROVED”, as applied to a material, device, mode of construction or as otherwise used in these Regulations means approved by the State Corporation Commission.

(Note: Equipment listed as satisfactory for specific purposes by nationally recognized testing laboratories (such as the Underwriters’ Laboratories, Inc., the Factory Mutual Laboratories, and the American Gas Association), when installed and used for the purposes intended, will be accepted as approved, unless specifically prohibited elsewhere in these Regulations.)

“APPROVED MASONRY” means masonry constructed of brick, stone, concrete, hollow block, solid block, or other material, or a combination of these materials as approved by the State Corporation Commission. (See Section 500.)

“AREA”, as applied to the dimensions of a building, means the maximum horizontal projected area of the building at grade.

“AUTOMATIC”, as applied to a fire door or other opening protective, means normally held in an open position and automatically closed by a releasing device that is activated by abnormal high temperature, by a predetermined rate of rise in temperature, or by the presence of smoke.

“BALCONY”, as applied to a theater or auditorium, means the seating tier next above the main floor.

“BASEMENT” means that story of a building the floor of which is not less than two feet below grade and the ceiling of which is not less than four feet and six inches, but not more than seven feet and six inches, above grade.

“BUILDING” means a public building as defined in Paragraph 100-2 (a). The term “Building” shall be construed as if followed by the words “or part thereof”. When a building is divided by a Fire Wall or Fire Walls into two or more sections, each section shall be regarded as a separate building.

“CELLAR” means that story of a building the ceiling of which is entirely below or less than four feet and six inches above grade.

“CONCRETE” means a mixture of portland cement, aggregate and water, of such materials, proportions, and manipulation as to give specified results.

“ELEVATOR” means a device within or in connection with a building used for carrying persons or things upward or downward; and includes dumbwaiter and similar devices, but does not include moving stairway.

“EXISTING” means heretofore erected or installed.

“EXIT DOORWAY” means a doorway leading into an Exitway or to a street or to an open place giving safe access to a street.

“EXIT FACILITY” – See Subsection 401-1.

“EXITWAY” means the necessary combination of “Exit Facilities” through which persons may proceed safely in case of emergency from any floor of a building to the main entrance floor or to a street or an open space which provides safe access to a street; provided that Exitways from the main entrance floor shall discharge directly to a street or an open space which gives safe access to a street.

“FIRE DIVISION” – A building is considered to be located in a fire division when, due to segregation by open space, Fire Walls or other means of protection, a fire therein, under normal conditions, would burn itself out without spreading to buildings or combustible materials outside the fire division, and in which a fire originating in buildings or combustible materials outside such fire division would burn itself out without spreading to a building in the fire division.

“FIRE DOOR” means a door and its assembly, so constructed and assembled in place as to give the specified protection against the passage of fire.

“FIRE PARTITION” – See Section 502.

“FIRE RESISTANCE RATING” means the time in hours that the material or construction will withstand the standard fire exposure as determined by a fire test made in conformity with the “Standard Methods of Fire Tests of Building Construction and Materials” of the American Standards Association, or any rating accepted by the Commission for a type of construction. Fire resistance ratings for materials or constructions which are set forth in Appendix B or in any of the Codes or Standards recognized by Section 500 will be accepted by the Commission.

Materials or construction rated as “combustible” shall not be acceptable for specified rating of over one hour.

“FIRE WALL” means a wall constructed in accordance with Section 501, for the purpose of subdividing a building or separating buildings to restrict the spread of fire and which starts at the foundation and extends continuously through all stories.

“FIREPROOF CONSTRUCTION” – See Subsection 301–1.

“FLAMMABLE LIQUID” means a liquid having a flash point not greater than two hundred degrees, Fahrenheit.

“FLAMEPROOF” as applied to decorations, curtains, draperies, scenery, tents, woodwork or other normally combustible materials means treated so it will not propagate flame.

“FLOOR AREA” means a floor space enclosed by walls or partitions, provided that where the building has any side open the floor line shall determine the limit of that side. In the case of structures such as stadiums which are neither enclosed nor roofed over, the floor area shall be considered as the projected area on a horizontal plane.

“FRAME CONSTRUCTION” – See Subsection 301–1.

“GALLERY” means any seating tier above the balcony in a Place of Assembly.

“GARAGE” means a building in which a motor vehicle containing flammable liquid or flammable gas in its fuel storage tank is stored, housed or kept.

“GRADE”, with reference to a building, means, when the curb level has been established, the mean elevation of the curb level opposite those walls that are located on, or parallel with and within fifteen feet of, street lines; or, when the curb level has not been established, or all the walls of the building are more than fifteen feet from street lines, “grade” means the mean elevation of the first ground surface adjoining the building along such wall.

“GROUP A BUILDING” – See Section 300

“GROUP B BUILDING” – See Section 300

“GROUP C BUILDING” – See Section 300

“GROUP D BUILDING” – See Section 300

“GROUP E BUILDING” – See Section 300

“HALLWAY” means an enclosed area within a building devoted to the horizontal movement of persons or goods.

“HEAVY-TIMBER CONSTRUCTION” – See Subsection 301–1.

“HEIGHT”, as applied to a building, means the vertical distance from grade to the highest finished roof surface in the case of flat roofs or to a point at the average height of roofs having a pitch of more than one foot in four and one-half feet; “height” of a building in stories does not include basement and cellar stories.

“HEIGHT”, as applied to a court, means the vertical distance from the level of the floor of the lowest story served by that court to the level under consideration.

“HEIGHT”, as applied to a story, means the vertical distance from top to top of two successive tiers of floor beams or finished floor surfaces.

“HEIGHT”, as applied to a wall, means the vertical distance to the top measured from the foundation wall, or from a girder or other immediate support of such wall.

“HEREAFTER”, as used in connection with any provision of these Regulations, present or future, means after the date of adoption of such provision.

“HERETOFORE”, as used in connection with any provision of these Regulations, present or future, means before the date of adoption of such provision.

“HOTEL” means a building in which rooms are rented for temporary occupancy for lodging purposes and includes commercial hotels, resort hotels, tourist courts, lodging houses and buildings similarly occupied.

“LODGING HOUSE” – See “Hotel”.

“LOT” means a portion or parcel of land considered as a unit, devoted to a certain use or occupied by a building or a group of buildings that are united by a common interest or use, and the customary accessories and open spaces belonging to the same.

“LOT LINE” means a line dividing one lot from another, or from a street or other public space.

“MASONRY” – See “Approved Masonry”.

“MEZZANINE” means a partial floor.

“MULTIFAMILY HOUSE” means a building occupied as the home or residence of individuals, families or households living independently of each other, of which 4 or more are doing cooking within their apartments; including tenement house, apartment house, flat. A row of 4 or more single family houses not separated by Fire Walls is considered to be a multifamily house.

“OCCUPIED”, as applied to a building, shall be construed as though followed by the words “or intended, arranged or designed to be occupied.”

“¾-HOUR FIRE RESISTING PARTITION” – See Section 503.

“ORDINARY CONSTRUCTION” – See Subsection 301-1.

“PENT HOUSE” means an enclosed structure other than a roof structure, located on the roof, extending not more than twelve feet above the roof.

“PLACE OF ASSEMBLY” means a room or space in which one hundred or more persons are congregated for religious, recreational, educational, political, social or amusement purposes or for the consumption of food or drink. Such room or space shall include any occupied appurtenant rooms or space.

“PROSCENIUM WALL” means the wall which separates the stage section of a building from the auditorium.

“PUBLIC BUILDING” – See Paragraph 100–2(a).

“REPAIR” means the replacement of existing work with the same kind of material used in the existing work, not including additional work that would affect the structural safety of the building, or that would affect or change required exit facilities, or that would affect a vital element of an elevator, gas piping, wiring or heating installation, or that would be in violation of a provision of these Regulations.

“REQUIRED” means required by some provision of these Regulations.

“ROOF STRUCTURE” means a structure above the roof of any part of a building enclosing a stairway, tank, elevator machinery, or ventilating apparatus, or such part of a shaft as extends above the roof.

“ROOMING HOUSE” – See “Apartment House”.

“SELF-CLOSING”, as applied to a fire door or other opening protective, means normally closed and equipped with an approved device which will insure closing after having been opened for use.

“SEMI-FIREPROOF CONSTRUCTION” – See Subsection 301–1.

“SHAFTWAY” means the space formed by the vertical projection between unpierced floors or roof of an opening in any intermediate floor or floors.

“SOLID BLOCK” means a building unit of burnt clay, concrete, or other approved incombustible material the gross cubic content of which is not less than fifty percent greater than the standard size of brick, and in which there are no cellular spaces, not including the scoring of the face, exceeding in the aggregate 25 percent of the gross cubic content of the unit.

“SPRINKLERED” means equipped with an approved automatic sprinkler system, properly maintained.

“STAIRWAY” means one or more flights of stairs and the necessary landings and platforms connecting them, to form a continuous and uninterrupted passage from one story to another in a building or structure.

“STANDARD FIRE TEST” means the fire test formulated under the procedure of the American Standards Association as “American Standard” and designated as American Standard A2.1 – 1942.

“STORAGE BUILDING” – See Subsection 300–1.

“STORY” means that part of a building between a floor and the floor or roof next above; provided that such space above a mezzanine, the area of which is 25 percent or less of the area of the floor below, is not considered as a separate story. Basements and cellars are stories for all purposes of these Regulations except the computation of “height” in stories.

“STREET” means any public thoroughfare (street, avenue, boulevard, park) or space more than 20 feet in width which has been dedicated or deeded for public use.

“STREET LINE” means a lot line dividing a lot from a street.

“UNPROTECTED METAL CONSTRUCTION” – See Subsection 301–1.

“VERTICAL OPENING” means a communicating opening between two stories of a building.

“WALLS”:

“Bearing Wall” means a wall, which supports any vertical load in addition to its own weight.

“Curtain Wall” means a non-bearing wall between columns or piers and which is not supported by girders or beams.

“Foundation Wall” means a wall below the first floor extending below the adjacent ground level and serving as support for a wall, pier, column or other structural part of a building.

“Non-Bearing Wall” means a wall, which supports no load other than its own weight.

“Panel Wall” means a non-bearing wall in skeleton construction, built between columns or piers and wholly supported at each story.

“Party Wall” means a wall used or adapted for joint service between two buildings.

ARTICLE 3 - CLASSIFICATION AND RESTRICTIONS

SECTION 300. CLASSIFICATION OF OCCUPANCIES

300-1. Classes Designated

(a) For the purpose of these Regulations, buildings are classified, with respect to occupancy and use, as Group A, Group B, Group C, Group D and Group E.

(b) "GROUP A BUILDING" means a building in which persons congregate for civic, political, educational, religious, social or recreational purposes; including among others,

armories	court houses	museums
assembly halls	dance halls	passenger stations
auditoriums	exhibition buildings	recreation piers
bath houses	grandstands	restaurants
bowling alleys	gymnasiums	schools
churches	lecture halls	skating rinks
city halls	libraries	stadiums
club rooms	lodge rooms	theaters
colleges	motion picture theaters	

(c) "GROUP B BUILDING" means a building in which persons are harbored to receive medical, charitable or other care or treatment, or in which persons are held or detained by reason of public or civic duty, or for correctional purposes; including among others,

asylums	jails	school, orphanage, and
homes for the aged	nurseries	other dormitory for
hospitals	penal institutions	children below high
houses of correction	reformatories	school age
infirmaries	sanitariums	

(d) "GROUP C BUILDING", except when classed as a Group B building, means a building in which sleeping accommodations are provided; including among others,

apartments	hotels	school, orphanage, and
club houses	lodging houses	other dormitories for
convents	multifamily houses	children of high
	tenements	school age or older

(e) "GROUP D BUILDING" means a building occupied for the transaction of business, for the rendering of professional services, for the display or sale of goods, wares or merchandise, or for the performance of work or labor; including among others,

bakeries	laboratories	stores
banks	laundries	telephone exchanges
factories	markets	work shops
ice plants	office buildings	

(f) "GROUP E BUILDING" means a building for the housing, except for purely display purposes, of airplanes, automobiles, railway cars or other vehicles of transportation, for the sheltering of horses, live stock or other animals, or exclusively for the storage of

goods, wares or merchandise, not excluding in any case offices incidental to such uses; including among others,

freight depots
garages

grain elevators
hangars

storage warehouses

300-2. Mixed Occupancy

In case a building is occupied for two or more purposes not included in one class, the provisions of these Regulations applying to each class of occupancy shall apply to such parts of the building as come within that class; and if there should be conflicting provisions, the requirements securing the greater safety shall apply.

300-3. Doubtful Classification

In case a building is not specifically provided for, or where there is any uncertainty as to its classification, its status shall be fixed by the State Corporation Commission, giving due regard to safety.

SECTION 301. CLASSIFICATION OF CONSTRUCTION

301-1. Type Designated

- (a) For the purposes of these Regulations, construction as used in buildings shall be classified as follows. The order of classification is from most restrictive to least restrictive.
- (1) Fireproof
 - (2) Semi-fireproof
 - (3) Heavy Timber
 - (4) Ordinary
 - (5) Noncombustible
 - (6) Frame
 - (7) Unprotected Metal
- (b) "FIREPROOF" construction, as applied to a building, means that in which the structural members, including interior and exterior bearing walls and exterior non-bearing walls, are of approved incombustible construction having the necessary strength and stability and having a fire resistance rating of not less than shown in Table 1. A combustible roof may be used when it is protected by an approved automatic sprinkler system and the ceiling of the top story is of Fireproof construction.
- (c) "SEMI-FIREPROOF" construction, as applied to a building, means that in which the structural members, including interior and exterior bearing walls and exterior non-bearing walls, are of approved incombustible construction having the necessary strength and stability and having a fire resistance rating of not less than shown in Table 1. A combustible roof may be used when it is protected by an approved automatic sprinkler system and the ceiling of the top story is of Semi-fireproof construction.
- (d) "HEAVY TIMBER" construction, as applied to a building, means that in which the exterior walls and bearing walls are of approved masonry or reinforced concrete and in which the interior structural elements, including columns, floors, and roof construction,

- consist of an approved assembly of heavy timbers with smooth flat surfaces assembled to avoid thin sections, sharp projections and concealed or inaccessible spaces, or are of incombustible materials protected to have a fire resistance rating of not less than $\frac{3}{4}$ hour, and in which all structural members which support masonry walls shall have a fire resistance rating of not less than three hours.
- (e) "ORDINARY" construction, as applied to a building, means that in which exterior walls and bearing walls are of approved masonry or reinforced concrete and in which the structural elements are wholly or partly of wood of smaller dimensions than required for Heavy Timber construction, or of other materials not protected as required for Heavy Timber construction.
 - (f) "NONCOMBUSTIBLE" construction, as applied to a building, means that in which all structural members including walls, floors, roofs and their supports, are of steel, iron, concrete, or of other incombustible materials, and in which the exterior walls have not less than a two-hour fire resistance rating as tested for an interior and an exterior fire.
 - (g) "FRAME" construction, as applied to a building, means that in which walls and interior construction are wholly or partly of wood.
 - (h) "UNPROTECTED METAL" construction, as applied to a building, means that in which the structural supports are unprotected metal and in which the roofing and walls or other enclosures are of sheet metal, or of other incombustible materials, or of masonry deficient in thickness or otherwise not conforming to approved masonry.

301-2. Partial Compliance

Nothing in these Regulations shall require full compliance with a type of construction, if, under these Regulations, a less restrictive type of construction is permitted; but no building shall be deemed of a given type of construction unless it conforms with all specific provisions of these Regulations applying to that type.

TABLE 1
REQUIRED FIRE RESISTANCE RATINGS OF STRUCTURAL ELEMENTS IN HOURS

STRUCTURAL ELEMENT		TYPE OF CONSTRUCTION	
		Fireproof	Semi-Fireproof
EXTERIOR BEARING WALLS		4	3
EXTERIOR NON-BEARING WALLS, when having the following distance to a lot line or to another structure, whichever is nearer, except that measurements may be taken from opposite sides of streets.	Less than 6 ft.	4	3
	6 ft. or more, but less than 11 ft.	3	2
	11 ft. or more, but less than 21 ft.	2	1½
	21 ft. or more, but less than 30 ft.	1½	1½
	30 ft. or more	0	0
INTERIOR BEARING WALLS & PARTITIONS		4	3
COLUMNS, GIRDERS, BEAMS, TRUSSES and similar members other than Roof Trusses.	Supporting masonry or bearing walls	3*	2*
	Supporting one floor	3	2
	Supporting more than one floor	4	3
FLOOR CONSTRUCTION		3	2
ROOF CONSTRUCTION AND ROOF TRUSSES AND FRAMING, when height to lower chord from highest floor, balcony or mezzanine is:	15 ft. or less	2	1½
	More than 15 ft., but less than 20 ft.	¾	¾
	20 ft. or more	0	0

*But not less than the required fire resistance of the wall supported.

SECTION 302. RESTRICTIONS ON TYPES OF CONSTRUCTION

302-1. General

- (a) Every building hereafter erected exceeding the height limitations fixed in these Regulations for Semi-fireproof construction shall be of Fireproof construction.
- (b) No change in occupancy of a building is permitted which would result in violation of the height limitation for a building hereafter erected, provided the Commission may authorize such a change of occupancy when it involves a move from a more hazardous building and the original building is not thereafter used for any purpose in violation of the height limitation for a building hereafter erected.

302-2. Special Occupancies

- (a) The following Group A buildings shall be of Fireproof or Semi-fireproof construction, except that portions of such buildings not over one story or over 45 feet in height may have combustible roof construction if protected by Fire Retardant Ceilings. In schools this provision applies only to the portion of the building (including appurtenant rooms) which contains one of the following occupancies.
 - (1) Theaters, motion picture theaters, or auditoriums having provisions for the vertical movement of scenery.
 - (2) Theaters, motion picture theaters, or auditoriums having seating facilities on more than one tier above the main floor.
 - (3) Theaters, motion picture theaters, or auditoriums whose capacities exceed 800 persons.
 - (4) Buildings housing theaters, motion picture theaters, dance halls, roof gardens, night clubs, skating rinks, lodge halls, lecture halls, auditoriums, or gymnasiums with a capacity in excess of 600, located on any floor other than the main entrance floor.
- (b) No theater or motion picture theater with a capacity in excess of 200 shall be located in a building of Frame or Unprotected Metal construction.
- (c) Any Group B building hereafter erected shall be Fireproof or Semi-fireproof construction except as follows:
 - (1) Such buildings where occupants are involuntarily detained or bed-ridden may be of other types of construction provided they do not exceed one story in height and all structural members, including columns, floors, walls and partitions, are of incombustible material and have a fire resistance rating of not less than $\frac{3}{4}$ hour.
 - (2) Such buildings where the occupants are not involuntarily detained or bed-ridden may be of other types of construction provided they do not exceed two stories in height and the floors and partitions have a fire resistance rating of not less than $\frac{3}{4}$ hour with Fire Retardant ceilings under roof and further provided that Frame construction shall not exceed one story in height.

SECTION 303. HEIGHT RESTRICTIONS

303-1. General

No building shall exceed in height the limits fixed in this Section.

303-2. Alterations

No building shall be altered so as to exceed the limits of height fixed by this Section.

303-3. Height Limits

Maximum building height limits shall be as shown in Table 2.

(Note: See Subsection 302-2 for height limits for certain special occupancies. See Section 601 for sprinkler requirements based on height and occupancy. See Subsection 303–4 for general exceptions.)

303-4. Exceptions

- (a) For the purpose of this Section, the following appurtenances shall not be deemed parts of buildings: church spires, tanks and their supports, roof structures, chimneys, signs attached to the building, radio masts, water cooling towers for air conditioning or other apparatus, and parapets that do not extend more than four feet above the roof surface at their point of contact.
- (b) The State Corporation Commission, with the approval of the Chief Executive officer of the political subdivision affected, may permit the erection of buildings of greater height than otherwise fixed by this Section, where such buildings are for Group A, Group D or Group E occupancy and are so located, constructed and protected as not to produce an undue hazard to the occupants of the building.
- (c) Structures of Unprotected Metal construction used in connection with water tanks and industrial processes shall not be limited as to height.
- (d) One story wings of Noncombustible or Unprotected Metal construction, without basements or cellars, may be attached to Fireproof or Semi-fireproof buildings. This exception does not apply to Group B buildings where the occupants are bed-ridden or involuntarily detained.

SECTION 304. ADDITIONS

304-1. General Requirements for Additions

Additions to new buildings and existing buildings shall conform to the requirements for new construction.

304-2. When Additions are Prohibited and Fire Walls are Required

- (a) No addition shall be made to a building heretofore or hereafter erected when the building being added to exceeds the height limits for new construction unless the addition is protected therefrom by a Fire Wall.
- (b) No addition shall be made to a building heretofore or hereafter erected if the addition will exceed the height limits for new construction for the occupancy classification of the building being added to unless the latter is protected from the addition by a Fire Wall.

(Note: See Section 501 for construction of Fire Walls.)

TABLE 2
Building Height Limits

Classification of Occupancy	TYPES OF CONSTRUCTION				
	Fireproof	Semi-Fireproof	Heavy Timber	Ordinary and Noncombustible	Frame and Unprotected Metal
Group A Buildings	No Limit	6 Stories, except no limit if less than 100 persons above 6 th story	4 Stories See Note (a)	Churches – 2 Stories Schools – 2 Stories Other – 3 Stories See Note (a)	2 Stories See Note (a)
Group B Buildings	No Limit	6 Stories	2 Stories See Note (b)	2 Stories See Note (b)	1 Story See Note (b)
Group C Buildings	No Limit	No Limit	6 Stories	3 Stories See Note (c)	2 Stories
Group D Buildings	No Limit	6 Stories, except office buildings, no limit	6 Stories	4 Stories	2 Stories
Group E Buildings	No Limit	4 Stories, 6 Stories if sprinklered	3 Stories, 6 Stories if sprinklered	3 Stories, 4 Stories if sprinklered	1 Story

(a) See Paragraphs 302-2(a) and (b) for further restrictions.

(b) See Paragraph 302–2(c) for further restrictions.

(c) With a two-hour incombustible first floor, height may be 4 stories. In multi-family houses with a two-hour incombustible first floor, with other floors one-hour, and with Fire Partitions sub-dividing floors into areas not exceeding 3,500 square feet, the height may be 5 stories.

304-3. Exits from Additions

Additions shall have a means of egress conforming to Article 4.

(Note 1: See Paragraph 402-4(b) for an exception to this rule for school and Group B buildings.)

(Note 2: Under this rule it would be permissible for an addition to make use of surplus exit capacity in the older building if the older Exitways meet all the requirements of Article 4 as to location, enclosure, etc.)

304-4. When Additions Must be Protected by Fire Partitions

When a three-story or higher addition is made to an existing three-story or higher building, the addition shall be separated therefrom by a Fire Partition unless the stairways, elevator and dumbwaiter shafts and other shaftways in the existing building other than ducts, flues and incinerator chutes are enclosed with $\frac{3}{4}$ -hour Fire Resisting Partitions to the extent necessary to prevent a fire originating on any floor from spreading to any other floor.

(Note 1: See Section 502 for construction of Fire Partitions.)

(Note 2: See Section 503 for construction of $\frac{3}{4}$ -hour Fire Resisting Partitions.)

SECTION 305. CHANGE OF OCCUPANCY

305-1. When Prohibited

No change in occupancy of a building is permitted which would result in violation of the height limitation for a building hereafter erected, provided the Commission may authorize such a change of occupancy when it involves a move from a more hazardous building and the original building is not thereafter used for any purpose in violation of the height limitation for a building hereafter erected.

ARTICLE 4 - MEANS OF EGRESS

SECTION 400. APPLICATION OF ARTICLE

400-1. New Buildings

Building shall be provided with means of egress in accordance with the requirements of this Article.

400-2. Alterations

No building shall be altered so as to reduce the number or capacity of Exitways to less than required for buildings of similar construction and number of occupants.

SECTION 401. GENERAL

401-1. Composition of Exitways

- (a) "Exitway" means the necessary combination of "Exit Facilities" through which persons may proceed safely in case of emergency from any floor of a building to the main entrance floor or to a street or an open space which provides safe access to a street; provided that Exitways from the main entrance floor shall discharge directly to a street or an open space which gives safe access to a street. An Exitway must be readily and easily accessible from all points of the floor which it serves.

(Note: See Paragraph 401-2(a) for modification of this rule.)

- (b) Exitways shall be composed only of an appropriate combination of such Exit Facilities as are permitted by this Article.

- (c) Exit Facilities permitted for use in Exitways are:

- | | |
|-----------------------------|---------------|
| (1) Interior Exit Stairways | (Section 404) |
| (2) Fire Towers | (Section 405) |
| (3) Horizontal Exits | (Section 406) |
| (4) Exterior Exit Stairways | (Section 407) |
| (5) Exit Ramps | (Section 408) |
| (6) Slide Type Fire Escapes | (Section 409) |
| (7) Exit Hallways | (Section 410) |
| (8) Exit Doorways | (Section 411) |

Such Exit Facilities shall conform to the appropriate provisions of this Article, and each shall be limited as to use in Exitways as specified in the individual Section governing it.

401-2. Arrangement of Exitways

- (a) All Exitways from Group A and B buildings shall discharge directly to a street or an open space which gives safe access to a street, and when two or more Exitways are required from Group C, D, and E buildings, at least one shall discharge directly to a street or an open space which gives safe access to a street.

- (b) 2 or more separate Exitways may lead through a common Exit Hallway on the ground floor provided the Exit Hallway discharges to the outside.
- (c) When a lobby, foyer or waiting room discharges directly to the outside, and the Commission is satisfied that only a negligible amount of combustibles will be introduced therein, it may permit Exitways to utilize such a room as an Exit Facility when:
 - (1) The room is otherwise constructed as an Exit Hallway, *or*
 - (2) The adjoining rooms are sprinklered, *or*
 - (3) The adjoining rooms are cut off therefrom by ¾-hour Fire Resisting Partitions.

401-3. Number of Occupants

- (a) The dimensions and capacity of Exitways shall be proportioned to the number of persons to be accommodated from each floor, and only the population of the floor in question need be considered when computing exit capacity; provided that Exitways shall not be decreased in width in the direction of normal exit travel.
- (b) When the number of persons to be accommodated by the Exitway is not ascertainable, it shall be decided on the basis of the gross area of the space devoted to a particular purpose and shall be assumed to be as follows:

<u>Occupancy</u>	<u>Gross Area Per Person</u>
Dance hall, lodge room, or Place of Assembly	15 Sq. Ft.
Store – street floor and sales basement	30 Sq. Ft.
Other floors	60 Sq. Ft.
School auditoriums and gymnasiums	6 Sq. Ft.
School cafeterias	10 Sq. Ft.
School libraries	25 Sq. Ft.
Space used for occupancies not listed above:	
Group A	40 Sq. Ft.
Group B	150 Sq. Ft.
Group C	125 Sq. Ft.
Group D	100 Sq. Ft.
Group E	300 Sq. Ft.

SECTION 402. NUMBER OF EXITWAYS

402-1. From Stories

Every story shall have at least one Exitway and every story that exceeds 4,000 square feet in area shall have at least two separate Exitways.

May 24, 1967 Amendment:

402-1. From Stories

- (a) Every story shall have at least one Exitway and every story that exceeds 4,000 square feet in area shall have at least two separate Exitways.*

(b) Exception. In apartment houses and multifamily houses any story more than 4,000 square feet in area but not more than 5,000 square feet in area may have a single Exitway under the following conditions:

- (1) There shall be no more than 4 apartments per floor.*
- (2) Buildings of Fireproof or Semi-fireproof construction shall be limited to 3 stories in height and a single basement or cellar. Buildings of Heavy Timber, Ordinary and Noncombustible construction shall be limited to 2 stories in height and a single basement or cellar. Buildings of other classifications of construction are not eligible for this exception.*
- (3) The Interior Exit Stairway shall be enclosed with Fire Partitions.
(Note: See Section 502 for construction of Fire Partitions.)*
- (4) Interior finish for walls and ceilings in the Interior Exit Stairway enclosure and all blocking and furring to which interior finish is attached shall have a flamespread rating of not more than 25 as classified in accordance with the Method of Test of Surface Burning Characteristics of Building Materials, American Society for Testing and Materials No. E-84. Interior finish not in excess of 10 percent of the aggregate wall and ceiling areas in the stair enclosure may have a flamespread rating of not more than 200 when used for trim, handrails and other incidental finish.*
- (5) The stair enclosure and the stairs shall be of noncombustible materials except for minor amounts of combustible trim and incidental finish as permitted in Item (4) above.*
- (6) Every sleeping room shall have a window, door or other opening directly to the outside which can be opened from the inside without the use of tools to provide a clear opening of not less than 16 inches in least dimension and 400 square inches in area, with the bottom of the opening not more than 38 inches above the floor, unless the sleeping room has 2 doors providing separate ways of escape to a room having such window, door or other opening.*

402-2. Places of Assembly

- (a) Every room, gallery, balcony, tier, or other space having a capacity of 100 or more persons shall be provided with at least two doorways, and where the capacity is more than 600 persons, at least three doorways, and where the capacity is more than 1,000 persons, at least four doorways. Such doorways shall be located a reasonable distance apart so that if one becomes blocked, the others will be available. The doorways shall conform to the design requirements of Section 411 for Exit Doorways and shall be marked and lighted as required for Exit Doorways in Section 412. They shall be so located that the Exitways from the floor are readily and easily accessible therefrom.
- (b) Every room, gallery, balcony, tier or other space having a capacity of more than 200 persons shall have access to at least two Exitways, and where the capacity is more than 600 persons, at least three Exitways, and where the capacity is more than 1,000 persons, at least four Exitways.

402-3. Residence Occupancy Located Above a Business Occupancy

Residence occupancies located above a business occupancy shall be provided with an Exitway in addition to any extending through the business area.

402-4. School Buildings and Group B Buildings

- (a) Every story of school buildings and of Group B buildings shall have at least two separate Exitways, except that neither this requirement nor any other requirement for multiple Exits shall apply to buildings occupied by persons under legal restraint.

(Note: The term, "persons under legal restraint" applies only to persons who are of sound mind and are not bedridden.)

- (b) When an addition not exceeding 4,000 square feet in area is made to a school building or Group B building heretofore or hereafter erected and is completely separated therefrom by a Fire Wall or a Fire Partition, an opening in the Fire Wall or Fire Partition may be accepted as one of the required Exitways from the addition. The other required Exitway must be in the addition.

(Note 1: See Section 501 for construction of Fire Walls.)

(Note 2: See Section 502 for construction of Fire Partitions.)

SECTION 403. LOCATION OF EXITWAYS

403-1. How Exitways are to be Located

- (a) Exitways shall be so located that no point in a floor area, room or space served by them is more than 100 feet distant from an Exitway measured along the line of travel; except that when a floor area is subdivided into smaller areas, such as rooms in hotels, multifamily houses, and office buildings, the distance from the door of any room, along an unobstructed hallway, to an Exitway shall be not more than 125 feet, except that hallways above the first story shall not extend beyond an Exitway as a dead end more than 50 feet. Where the building is of Fireproof construction or Semi-fireproof construction, or the building is sprinklered, the above distances may be increased 50 percent. For single story industrial and Class E buildings the distance to the nearest Exitway from any point may be 150 feet for unsprinklered buildings and 250 feet for sprinklered buildings.
- (b) Exitways shall be located with proper regard to safety of the occupants and ease of exit. The size and shape of the room or space, the accessibility of streets and open spaces, the ability to use Horizontal Exits, and the desirability of good separation of Exitways shall be considered.

May 24, 1967 Amendment:

403-1. How Exitways are to be Located

- (a) *Exitways shall be so located that no point in a floor area, room or space served by them is more than 100 feet distant from an Exitway measured along the line of travel; except that when a floor area is subdivided into smaller areas, such as rooms in hotels, multifamily houses, and office buildings, the distance from the door of any room, along an unobstructed hallway, to an Exitway shall be not more than 100 feet in*

Group C buildings and not more than 125 feet in other occupancies except that hallways above the first story shall not extend beyond an Exitway as a dead end more than 50 feet. Where the building is of Fireproof construction or Semi-fireproof construction, or the building is sprinklered, the above distances may be increased 50 percent. For single story industrial and Class E buildings the distance to the nearest Exitway from any point may be 150 feet for unsprinklered buildings and 250 feet for sprinklered buildings.

(b) [no change]

SECTION 404. INTERIOR EXIT STAIRWAYS

404-1. Construction and Arrangement of Interior Exit Stairways

- (a) Interior Exit Stairways shall be constructed of incombustible materials throughout, except in buildings of Frame construction, and in buildings of Ordinary construction not exceeding 30 feet to the floor of the topmost story occupied by not more than 75 persons above, or 40 persons below, the first story above grade. All such stairways shall have risers securely fastened in place, and, except in industrial and Class E buildings, risers shall be solid.
- (b) When treads or landings are slate, marble, stone, or composition, they shall be substantially supported for their entire length and width.
- (c) Treads and landings shall be constructed and maintained in a manner to prevent persons from slipping thereon.
- (d) The continuity of all stairs which may be used for exit purposes shall be interrupted at street level by partitions or doors, or other means shall be used to indicate the main floor level and make clear the direction of egress to the street.

404-2. Enclosure

- (a) All interior stairways connecting two or more stories, whether used as Interior Exits Stairways or not, shall be enclosed, except as otherwise provided in Paragraph (d) below.
- (b) Interior stairways shall be enclosed with Fire Partitions in unsprinklered buildings 4 stories or more in height.

(Note: See Section 502 for construction of Fire Partitions.)
- (c) In other buildings interior stairways shall be enclosed in partitions having a fire resistance rating of not less than $\frac{3}{4}$ hour.
- (d) An enclosure shall not be required for:
 - (1) A flight of stairs from any floor to the floor next above when such stairs are not part of an Exitway and are enclosed at the upper floor and connect only two floors.
 - (2) A flight of stairs in a building of Fireproof construction, Semi-fireproof construction, or a sprinklered building of Heavy Timber construction or Ordinary construction or Non-combustible construction, when such stairs connect only one story with one other story immediately above or below it and are not a part of an Exitway. In such case the upper end of the stairway shall not connect to an Exit Hallway except through a fire door.

(3) A flight of stairs from a balcony or mezzanine having an area not exceeding 25% of that of the story immediately below, except that stairs from the first floor to the first balcony or mezzanine need not be enclosed in Places of Assembly.

(4) Stairways in Group A and D buildings under the following conditions:

The building must not exceed two stories in height.

The stairway must connect only one story with one other story immediately above or below it.

Not less than two well separated Exitways shall be provided from each occupied floor.

Interior Exit Stairways shall discharge directly to the outside at ground level in such a manner that it shall not be necessary for persons using the stair to pass through any corridor, lobby or other space outside the normal confines of the stairway area.

Interior Exit Stairways from basements and cellars shall be fully enclosed.

Other stairways from basements and cellars shall be enclosed at head or foot unless the basement is sprinklered.

(5) Stairways in buildings occupied by persons under legal restraint.

(Note: The term "persons under legal restraint" applies only to persons who are of sound mind and are not bedridden.)

(e) No openings except necessary Exit and entrance doorways, and windows opening to the exterior of the building, will be permitted in a required stairway enclosure. Such doorways shall be equipped with approved self-closing fire doors, except that when Fire Partitions are not required for the enclosure, substantial self-closing metal or metal covered doors or solid wooden doors of the flush type of nominal thickness not less than 1¾ inches may be used. In school buildings, doors on openings in stairway enclosures may have wired glass panels; the area of such glass in any one door shall not exceed 720 square inches. Doors protecting openings in required enclosures of stairways which are frequently used for other than emergency purposes and doors protecting openings in required enclosures of stairways in sprinklered buildings may be arranged to close automatically in case of fire. Fastening devices may be omitted on doors protecting openings in stairway enclosures, except when enclosures are required to be Fire Partitions. Door closers shall be of an approved type.

404-3. Moving Stairways

- (a) Moving stairways moving in the direction opposite to that of egress which are equipped at the head of each flight with a device for stopping all flights simultaneously, and moving stairways moving in the direction of egress, may be considered as Exit Facilities, provided they conform in all respects to requirements of this Section for protection of required interior stairways, except the requirement for minimum width which shall be not less than 24 inches.
- (b) In sprinklered buildings moving stairways which are not considered as required Exit Facilities need not be enclosed as required for interior stairways, if enclosed in each story at the upper floor landing by an incombustible enclosure equipped with an approved double acting self-closing or automatic door or doors of metal and wired glass. Wired glass in metal framework may be used for the enclosure provided no

pane of glass has a length or width greater than 48 inches. The enclosure shall include a landing at each floor which is of sufficient length beyond the handrail and having a width not less than that of the floor opening.

- (c) In lieu of the enclosure requirements of paragraph 404-3(b), above, the Commission may, upon application, approve automatic water spray or other protection devices which it believes will accomplish the same results respecting safety to life.

404-4. Width

- (a) Except as provided in Paragraph 404-4(b), below, the required exit width of an Interior Exit Stairway shall be not less than 44 inches; provided that in multifamily houses and Group E buildings, and in other buildings occupied by a single tenant and limited in occupancy to 40 persons, such width may be 36 inches.
- (b) Interior Exit Stairways from boiler rooms, service rooms, chemical process rooms, projection booths, elevator machinery rooms and similar rooms or spaces which are normally occupied by 10 or less people, and are not open to the general public, shall be of sufficient width to adequately serve their purpose in case of emergency. Where the room or space is normally unoccupied, ladders or other approved exit devices may be substituted for stairways as Exit Facilities.
- (c) The net clear width of an Interior Exit Stairway (i.e., the least distance between any combination of enclosure walls, balustrades, handrails, newels, etc.) shall not be less than the required exit width, except:
 - (1) When a handrail is attached to an enclosure wall of an Interior Exit Stairway, and projects not more than 3½ inches from the wall, the handrail may be disregarded in measuring the net clear width.
- (d) The unit of stairway width used as a measure of exit capacity shall be 22 inches. Fractions of a unit shall not be included except that an allowance of ½ unit may be made for 12 or more inches of additional stairway width.
- (e) The aggregate width of Exit Stairways serving any story shall be in accordance with the following table and shall be based on the number of occupants of that story as determined by Subsection 401-3.

	Number of Persons Per Unit of Exit Width	
	Unsprinklered Buildings	Sprinklered Buildings
Places of Assembly on ground or street floor	100	150
Occupancies other than listed above:		
Group A -----	60	90
Group B -----	30	45
Group C -----	30	45
Group D -----	60	90
Group E -----	60	90

Example of Stairway Width Calculation

Assumed an unsprinklered 4-story apartment building (Group C occupancy) with Place of Assembly (Group A occupancy) in the basement, with the gross floor area below. Each story above the basement exceeds 4000 sq. ft. in area and, therefore, must have

not less than two 44-inch stairs. The Place of Assembly in the basement accommodates over 200 persons (3300 sq. ft. ÷ 15 sq. ft./person) so it must also have two 44-inch stairs as a minimum.

4 th floor	7,875 Sq. Ft.
3 rd floor	18,000 Sq. Ft.
2 nd floor.....	18,000 Sq. Ft.
1 st floor	18,000 Sq. Ft.
Basement	3,300 Sq. Ft.

The aggregate required Exit Stair width would be:

(a) from 4th floor

$$\frac{7875 \text{ sq. ft.}}{125 \text{ sq.ft./person} \times 30 \text{ persons/unit}} = 2.1 \text{ stair units}$$

hence, two 44-inch stairs would be adequate.

(b) from 2nd and 3rd floors

$$\frac{18000 \text{ sq. ft.}}{125 \text{ sq.ft./person} \times 30 \text{ persons/unit}} = 4.8 \text{ stair units}$$

hence, one 44-inch stairway plus one 56-inch stairway, or three 44-inch stairways, would be necessary.

(c) from basement

$$\frac{3300 \text{ sq. ft.}}{15 \text{ sq.ft./person} \times 60 \text{ persons/unit}} = 3.7 \text{ stair units}$$

hence, two 44-inch stairs would be adequate.

Note: If a basement stairway is a continuation of a stair from the second story, and both discharge at the same point, it is necessary to add the capacity of both flights in order to arrive at the required units of Exit Door width.

Example: Suppose one of the 44-inch stairs from the basement joins a 56-inch stair from the 2nd story.

Capacity of 44-inch stairway is:
2 units x 60 persons/unit = 120 persons

Capacity of 56-inch stairway is:
2½ units x 30 persons/unit = 75 persons

Therefore, Total Capacity = 195 persons.

Thus, the doors leading to the outside would have to be designed to accommodate 195 persons. (Population of first floor need not be considered in this calculation)

404-5. Treads and Risers

- (a) Treads and risers of Interior Exit Stairways shall be proportioned for ease of exit. The risers shall not exceed 7¾ inches in height, and treads, exclusive of nosing, shall not be less than 9 inches wide. Treads and risers shall be of uniform width and height in any one story. The sum of two risers plus one tread shall not be less than 23½ nor more than 25 inches.
- (b) The use of winders is prohibited in Exit Stairways.

404-6. Landings

- (a) No flight of stairs in an Interior Exit Stairway shall have a vertical rise of more than 12 feet between floors or landings; except that in Interior Exit Stairways in Group A buildings such vertical rise shall not exceed 10 feet. No single flight of stairs shall have less than 3 risers.
- (b) The length and width of landings shall be not less than the width of stairways in which they occur, and the doors of Exit Doorways shall be so hung and arranged that when fully opened they will not in any way diminish or obstruct the required width of hallway, stair, or other Exit Facility.

404-7. Handrails

- (a) Stairs in Interior Exit Stairways shall have walls or well-secured balustrades or guards on both sides.
- (b) Such stairs, when less than 44 inches in width, shall have handrails on at least one side.
- (c) Such stairs, when required to be 44 inches or more in width, shall have handrails on both sides.
- (d) When the required width of a flight of stairs exceeds 88 inches, an intermediate handrail with a maximum lateral spacing of 66 inches, continuous between landings, securely supported and terminating at the upper end in newels or standards, shall be provided.

SECTION 405. FIRE TOWERS

405-1. How Constructed

- (a) Except as specified below, Fire Towers, when installed, shall conform to the requirements of this Article for Interior Exit Stairways. enclosing walls shall be of approved masonry or reinforced concrete and there shall be no openings in such walls, except for the necessary doors or windows. The Fire Tower shall have a roof of Fireproof construction.
- (b) Access to the Fire Tower at each story served thereby shall be by vestibules or outside balconies having floors of incombustible materials and provided with substantial guard railings at least 4 feet high, without any openings greater than 8 inches in width; except that for industrial and Group E buildings, triple guard rails equally spaced, with top rail not less than 3½ feet high may be used. Such balconies or vestibules shall adjoin either a street or a court not less than 10 feet wide nor less than 150 square feet in area, and the permissible doors and windows in the enclosing walls shall open on such street or court. The balconies or vestibules shall be level with the floors of the building and the stair landings of the Fire Tower. The clear width of such connecting

balconies and vestibules shall not be less than that required for Exit Hallways. Self-closing fire doors, swinging in the direction of travel from the building to the Fire Tower, shall be provided at both building and Fire Tower ends of the balcony or vestibules.

SECTION 406. HORIZONTAL EXITS

406-1. Composition

Horizontal Exits shall consist of vestibules, open-air balconies, bridges, or doorways through or around Fire Walls or Fire Partitions, connecting two floor areas. In buildings of other than Fireproof or Semi-fireproof construction, such Fire Partitions shall be continuous throughout all stories from the foundation to the roof.

406-2. Connecting Floor Areas

- (a) When a Horizontal Exit is required as an Exitway from the floor area on both sides of the Horizontal Exit, the floor area on either side shall be sufficient to hold the occupants of both floor areas.
- (b) When a Horizontal Exit is required as an Exitway from only the floor area on one side of the Horizontal Exit, there is no requirement as to the floor area on that side; but the floor area on the other side of the Horizontal Exit shall be sufficient to hold the occupants of both floor areas.
- (c) In determining the required floor area there shall be allowed not less than three square feet of clear floor space per person.

406-3. Arrangement

Where a Horizontal Exit is used there shall be at least one Exitway conforming to the requirements of this Article on each side of the Horizontal Exit. The capacity of such Exitway shall be adequate for the number of persons normally using the space on that side of the Horizontal Exit, less the capacity of the Horizontal Exit itself. In determining the number of such Exitways as required by the distance rule of Section 403, the Horizontal Exit may be treated as if it were also an Exitway.

406-4. Vestibules and Balconies

When vestibules or open-air balconies are used, they shall conform to the requirements for vestibules or open-air balconies of Fire Towers.

406-5. Bridges

When bridges are used they shall be constructed of incombustible material. The clear width of such bridges shall be not less than required for Exit Hallways.

406-6. Openings

All doorways or windows opening on, under or within 10 feet of such vestibules, balconies, or bridges shall be equipped with self-closing fire doors or approved fire windows.

406-7. Gradients

Where there is a difference in level between the connecting floor areas, gradients of not more than 1 foot in 8 feet shall be provided. No stairs or steps shall be used in a Horizontal Exit.

SECTION 407. EXTERIOR EXIT STAIRWAYS

407-1. General

- (a) Except for industrial buildings having not more than forty persons above the third story, for Group E buildings, and for sprinklered buildings of any occupancy, permission shall be obtained from the State Corporation Commission for the erection of an Exterior Exit Stairway to be used as an Exit Facility serving any story above third story.
- (b) Exterior Exit Stairways shall be constructed of incombustible materials except on buildings of Frame construction, and on buildings of Ordinary construction not over 3 stories in height. Exterior Exit Stairways shall conform to the requirements for Interior Exit Stairways in Section 404, except that enclosures shall not be required and risers may be open for a height of one inch or less at the bottom.

407-2. Access

Occupants of each story served by an Exterior Exit Stairway shall have direct access to the stairway through an Exit Doorway.

407-3. Openings Protected

Except where wooden stairways are permitted, all doors, windows opening on or within 10 feet of Exterior Exit Stairways shall be protected by approved self-closing fire doors or approved fire windows.

407-4. Guards

Metal mesh or other rigid guards at least 4 feet high without any openings greater than 8 inches in width shall be provided throughout on each unenclosed side of Exterior Exit Stairways; except that for industrial and Group E buildings, triple guard rails equally spaced, with top rail not less than 3½ feet high may be used.

407-5. Enclosures

If Exterior Exit Stairways other than wooden stairways are enclosed on any side such enclosure shall be of incombustible materials.

407-6. Glass

Glass used in the construction of enclosures shall be wired glass of approved type.

407-7. Strength

Exterior Exit Stairways shall be of sufficient strength to sustain a live load of 100 pounds per square foot or concentrated loads of 300 pounds spaced 3 feet center to center, each occupying an area at least one foot wide by the depth of the tread, whichever will produce the greater stress.

407-8. Details

Except for industrial and Group E buildings, all balcony floors and treads and risers of Exterior Exit Stairways shall be solid except that perforations not exceeding ½ inch in diameter may be used for purposes of drainage. Exterior Exit Stairways shall be built permanently to the ground.

SECTION 408. EXIT RAMPS

408-1. How Constructed

Exit Ramps shall be constructed, arranged and enclosed as required for the Interior or Exterior Exit Stairways displaced. Exit Ramps shall have a slope not to exceed 1 foot in 8 feet, except as otherwise provided in Article 7, and shall be provided with nonslip surfaces.

SECTION 409. SLIDE TYPE FIRE ESCAPES

409-1. How Constructed

Slide Type Fire Escapes shall be of approved type and conform to the following:

- (1) They shall not be used to provide means of egress from building exceeding 70 feet or 6 stories in height. The pitch and design shall be such that a person using the chute will be discharged without injury. Doors at the entrance to the chute shall have approved panic release and shall swing with the exit travel and be so installed that they will not obstruct the use of the chute. If doors are installed at the lower end of the chute, they shall be equipped with an approved releasing device on the inside.
- (2) All sheet metal used for the chute shall be corrosion resistant, shall not be painted on the inside and shall be maintained so as to be free from rust. Any part of the chute with which the user may come in contact shall be free from cracks, crevices, or any projection or roughness, which may cause injury or reduce the effectiveness of the chute.
- (3) All chutes shall be of sufficient size and ample strength and shall be supported in a substantial manner.
- (4) They shall be arranged and enclosed as required for the Interior or Exterior Stairway displaced.

SECTION 410. EXIT HALLWAYS

410-1. How Constructed

- (a) The clear width of every hallway or corridor used as an Exit Hallway shall be not less than the sum of the width of the Exit Facilities discharging into it and not less than the nominal required width of the Exit Doorways discharging from it in the direction of normal exit travel, but in no case shall it be less than 44 inches; provided that in multifamily houses and in case less than 40 persons are to be accommodated, the latter requirement may be reduced to 36 inches.
- (b) The enclosing walls, floors and ceilings of Exit Hallways connecting an Exit Stairway to the doorway leading to the outside shall have a fire resistance rating of not less than that required for the Exit Stairways which they serve; except that in sprinklered buildings of Fireproof or Semi-fireproof construction the enclosing walls may have panels of wired glass in metal frames. Openings therein shall be protected in the same manner as those in the Exit Stairways served thereby.

SECTION 411. EXIT DOORWAYS

411-1. Width

The aggregate nominal width of doorways serving as Exit Facilities shall be at the rate of one unit of exit width (22 inches) per 100 persons served, but in no case shall any Exit Doorway have a net clear width of less than 28 inches. The net clear width of Exit Doorways shall have the relation to nominal width and to units of exit width as shown in the table below:

Required Nominal Doorway Width	Minimum Permissible Net Clear Doorway Width	No. Units of Exit Width Allowed
22"	28"	1
36"	34"	1½
44"	40"	2
56"	52"	2½
66"	60"	3
88"	two 40"	4

(Note: Any desired combination of the above clear door widths may be used provided the corresponding allowable number of units is also sufficient. For example: Two 34 inch doors could be used in an Exit Doorway for 300 persons since 3 units would be required and each 34 inch door would give 1½ units.)

411-2. Hanging of Doors

- (a) The doors of Exit Doorways shall be so hung and arranged that when fully opened they will not in any way diminish or obstruct the required width of hallway, stair, or other Exit Facility.
- (b) Exit Doorways serving an Exitway for more than 50 persons shall have the doors, including the doors of vestibules, so hung as to swing open in the direction of exit travel; but this requirement shall not be construed to prohibit the use of sliding doors in stables, garages, or shipping and receiving rooms of Group D buildings and Group E buildings.
- (c) All exit doors of rooms occupied by 50 or more persons shall be hung to swing open in the direction of exit travel.
- (d) No Exit Doorway shall open immediately on a flight of stairs, but a landing the length and width of which are not less than the width of the Exit Doorway shall be provided between the Exit Doorway and such stairs.

411-3. Revolving Doors

- (a) Revolving doors, to be acceptable as Exit Doorways, shall have a width equal to that required for an acceptable swinging door, the width in the case of such a door with rigid braces being the width of a single wing, and in case of such a door in which the wings may be readily released from one another by pressure so they may swing independently being the aggregate clear width of the two openings on each side of the central shaft. All revolving doors in Exitways from Places of Assembly shall be of an approved type which will collapse under pressure, and only the width of one wing shall be considered in figuring exit capacity.

- (b) Revolving doors shall not be used as Exit Doorways at theaters or Group B buildings nor in buildings occupied as stores where more than 75 persons are likely to be congregated, unless there are also Exit Doorways of the swinging type having an aggregate width of at least 50 percent of required width of Exit Doorways and there is at least one swinging door adjacent to each revolving door. Revolving doors shall not be used in Exitways from school buildings.
- (c) Revolving doors shall not be used in Exitways from Places of Assembly except under one or more of the following conditions:
 - (1) Where the Place of Assembly is in a building of Fireproof or Semi-fireproof construction.
 - (2) Where the Place of Assembly and the remainder of the building are protected by an approved automatic sprinkler system.
 - (3) Where the Place of Assembly has a capacity of not over 200 persons and has an Exit Doorway of the swinging type adjacent to each revolving door.
 - (4) Where a place of refuge is provided for all occupants of the Place of Assembly in portions of the building between the Exit Doorways of the Place of Assembly and the revolving doors, and there is an Exit Doorway of the swinging type adjacent to each revolving door. Such place of refuge may consist of hallways, stairways, or areas separated from the Place of Assembly by Fire Walls or Fire Partitions.
- (d) Revolving doors shall be used in Exitways only at points in the first story above grade.

411-4. Panic Hardware

When fastening devices are installed on the Exit Doors of buildings or spaces in the classifications listed below, they shall be latches (fire exit bolts) which release when pressure of not to exceed 15 pounds is applied to the releasing devices in the direction of 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.

Schools having more than 4 classrooms.

Theaters of any capacity.

Places of Assembly having a capacity in excess of 500 persons, except Churches.

Places of Assembly in school buildings having a capacity in excess of 200 persons.

411-5. Other Door Hardware

- (a) Fastenings on doors serving Exit Doorways shall be such that the doors may be readily opened from the inside without the use of keys during the time when the building is occupied. Latches or other releasing devices to open doors shall be of simple types, the method of operation of which is obvious even in darkness.
- (b) Paragraph (a), above, shall not apply to the doors of rooms or spaces where persons are under legal restraint, but adequate arrangement shall be made to assure prompt evacuation of the occupants in case of fire.

SECTION 412. MAINTENANCE, MARKING AND LIGHTING

412-1. Physical Condition

Exitways shall at all times be maintained in good, safe, usable condition, and shall at all times be kept free and clear of obstructions and shall be readily accessible.

412-2. Exit Signs

- (a) In rooms and stories accommodating more than 100 persons, Exit Doorways shall be plainly marked by approved exit signs, sufficiently illuminated when the floor area is occupied to be readily distinguished.
- (b) Enclosed interior stairways and exterior stairways, which are provided in or for a building in addition to the required stairways and which do not conform to the provisions of this Article for required stairways, shall be marked in a suitable manner to indicate that they are not approved exits, but may be marked to indicate the extent to which they can be used as means of egress.
- (c) When the Exitways are not visible from all locations in public corridors directional signs shall be placed on walls or otherwise displayed in conspicuous locations to direct occupants thereto.

412-3. Lighting

- (a) Required Exitways, including exterior open spaces to which they lead which give safe access to a street, shall be kept adequately lighted at all times that the building served thereby is occupied.
- (b) Electrical lighting shall be provided wherever natural lighting is inadequate.
- (c) Adequate lighting shall be provided in Places of Assembly during occupancy, except during a performance requiring dimming or darkness. During the showing of motion pictures, where it is the practice for patrons to proceed to and from seats at any time, such light intensity shall not be less than 1/20 of a foot candle at every point thirty inches above the floor.
- (d) Required lights that are likely to be or become dangerous in any way to occupants shall be protected by suitable wire netting or other efficient means against breakage and other hazards.
- (e) In Group A buildings and Group B buildings the artificial lighting required by this Section shall be by electricity so arranged and supplied that the interruption of service on any other circuit inside the building will not result in interruption of the required lighting.

(Note: This does not necessarily require a second source of electrical energy for the building.)

412-4. Occupancy Prohibited

No part of an Exitway shall be used for any purpose which will interfere with its value as an Exitway.

412-5. Radiators

No coil or radiator or steam riser shall be placed in an Exit Stairway, nor in an aisle of a floor area in which seating accommodation is provided, unless the same be placed in a recess formed in or by the walls or partitions.

ARTICLE 5 - FIRE SAFETY FEATURES OF CONSTRUCTION

SECTION 500. MASONRY WALLS

500-1. General

Required masonry walls which are not otherwise regulated by this Article shall meet generally recognized minimum standards of safety. Such walls when conforming to the requirements of the current edition of any of the standards or codes listed below shall be accepted.

- (a) Building Code recommended by the National Board of Fire Underwriters.
- (b) Uniform Building Code recommended by the Pacific Coast Building Officials Conference.
- (c) Southern Standard Building Code recommended by Southern Building Code Congress.
- (d) Appropriate standards of the American Standards Association.
- (e) Any other standard or code which the Commission may from time to time recognize.

SECTION 501. FIRE WALLS

501-1. Application

Fire Walls for which credit is claimed under any provision of these Regulations shall conform to the requirements of this Section.

501-2. Construction

Fire Walls shall be of approved masonry or reinforced concrete.

501-3. Fire Resistance

Fire Walls for any combination of occupancy and construction shall have a fire resistance rating adequate to restrict the spread of fire from one side to the other, and shall have a fire resistance rating of at least 4 hours.

(Note: See definition of "Fire Division".)

501-4. Termination at Top

The Fire Wall shall extend at least three feet above the roof of the building which it is to protect except where the roof is of Fireproof or Semi-fireproof construction; in which case the Fire Wall shall be carried up tightly against the underside of the roof slab.

May 24, 1967 Amendment:

501-4. Termination at Top

- (a) The Fire Wall shall extend at least three feet above the roof of the building which it is to protect except where the roof is of Fireproof*

or Semi-fireproof construction; in which case the Fire Wall shall be carried up tightly against the underside of the roof slab.

(b) Exception. In apartment houses and multifamily houses having not more than 4 apartments per story the Fire Walls that are required to extend above the roof by paragraph (a) above may be terminated not less than 6 inches above the roof provided all roof sheathing, trusses, rafters, joists and other roof supporting construction within 4 feet of the center line of the Fire Wall, on each side of the Fire Wall, are of noncombustible materials, or are of combustible materials that have been treated by pressure impregnation so as to reduce flame spread and fuel contribution ratings of the materials to not more than 25 as classified in accordance with the Method of Test of Surface Burning Characteristics of Building Materials, American Society for Testing and Materials No. E-84.

501-5. Openings

- (a) Except in sprinklered buildings, no opening in a Fire Wall shall exceed 120 square feet in area, with no dimension greater than 12 feet, and the aggregate width of all openings at any level shall not exceed 25 percent of the length of the wall.
- (b) Every opening in a required Fire Wall shall be protected on each side of the wall with an automatic fire door, approved for such opening, except that when an opening in a Fire Wall serves as a Horizontal Exit, one of the fire doors at each such opening may be replaced by a fire door approved for openings in Fire Partitions. Steel plate security doors may be substituted for approved Fire Doors in applications involving the protection of buildings used or occupied by persons under legal restraint.

(Note: The term "persons under legal restraint" applies only to persons who are of sound mind and are not bedridden.)

SECTION 502. FIRE PARTITIONS

502-1. Construction

- (a) Fire Partitions shall have a fire resistance rating of at least two hours. They shall be constructed of approved masonry or reinforced concrete, or other approved form of construction of incombustible materials.
- (b) Fire Partitions shall be supported in each story on construction having a fire resistance rating of not less than two hours; provided that when they also are load bearing the supporting construction shall have a fire resistance rating not less than three hours in case the building is of Fireproof construction.
- (c) The maximum unsupported height of a Fire Partition shall not exceed thirty times its total thickness unless suitably reinforced and anchored at floor and ceiling, or unless substantially secured to vertical supports at intervals of not over thirty times the thickness.
- (d) Fire Partitions shall be deemed continuous, even though the several parts are not directly over one another in successive stories, if the intervening parts of the floors at the levels where offsets occur are unpierced and of Fireproof construction or Semi-fireproof construction and all parts not supported directly on the foundation are carried on Fireproof construction.

- (e) In buildings of Heavy Timber construction or of Ordinary construction, Fire Partitions, if required in a story as a Horizontal Exit, shall be continuous through all stories from the foundation to the roof. This shall not preclude offsetting of partitions if constructed in accordance with Paragraph 502-1(d), above.
- (f) Chases or recesses that would reduce the thickness below the required minimum shall not be built nor cut in Fire Partitions.

502-2. Openings

- (a) Fire Partitions shall have no openings other than required door openings, or properly protected duct openings.
- (b) Openings in required Fire Partitions shall be equipped with approved automatic closing or self-closing fire doors. A door listed in the current edition of the Underwriters Laboratories, Inc., "List of Inspected Fire Protection Equipment and Materials" as being approved for Class B situations shall be deemed satisfactory.
- (c) Each opening in a Fire Partition serving as an enclosure to an Exitway or as a Horizontal Exit shall be equipped with a door of the self-closing type, except as provided in Paragraph 404-2(e).

SECTION 503. ¾-HOUR FIRE RESISTING PARTITIONS

503-1. Construction

- (a) ¾-hour Fire Resisting Partitions shall have a fire resistance rating of at least ¾ hour. They shall be of an approved form of construction.
- (b) Such partitions may be load-bearing only where the construction is approved for that purpose.
- (c) Such partitions shall be well secured.

503-2. Openings

- (a) Required ¾-hour Fire Resisting Partitions shall have no opening other than required door openings, or properly protected duct openings.
- (b) Openings in required ¾-hour Fire Resisting Partitions shall be equipped with substantial metal or metal covered doors or solid wooden doors of the flush type of nominal thickness not less than 1¾ inches. Doors shall be self-closing except as provided in Paragraph 404-2(e).

SECTION 504. FIRE RETARDANT CEILINGS

504-1. Construction

Fire Retardant Ceilings shall be constructed in accordance with one of the following specifications:

- (1) Not less than three-quarter inch plaster on expanded metal lath securely attached to steel supports by wire or special metal fasteners, or to wood supports by one and one half-inch, eleven gage, seven-sixteenth inch head barbed roofing nails. Plaster to consist of one part gypsum to not over two parts sand for the scratch coat and one part gypsum to not over three parts sand for the brown coat, or to consist of portland cement and sand in the same

proportions, except that three pounds of asbestos fiber shall be added with each bag of cement.

- (2) Not less than one-half inch plaster consisting of one part gypsum to not over two parts sand on three-eighth inch perforated gypsum lath, attached to wood supports by nails not smaller than one and one-eighth inches long with three-eighth inch diameter heads, and with three-inch strips of expanded metal lath nailed over all joints in the gypsum lath with nails not smaller than one and three-quarter inches long with one-half inch heads.
- (3) Any combination floor and ceiling construction having a fire resistance rating of $\frac{3}{4}$ hour or more.

SECTION 505. MISCELLANEOUS REQUIREMENTS

505-1. Wood Construction Around Fireplaces, Flues and Chimneys

- (a) All wooden beams and joists shall be trimmed away from flues and chimneys. Headers, beams and joists shall be not less than two inches from the outside face of a chimney or from masonry enclosing a flue. Headers supporting trimmer arches or fireplaces shall be not less than six inches from the inside face of the nearest flue.
- (b) No woodwork shall be placed within four inches of the back face of a fireplace; nor shall combustible lathing, furring or studding be placed against a chimney; but this shall not prevent plastering directly on the masonry or on metal lath and furring.
- (c) No wooden mantel or other woodwork shall be hereafter placed within eight inches of either side nor within twelve inches of the top of a fireplace opening.
- (d) All spaces between the masonry or chimneys or flues and wooden joists, beams or headers shall be firestopped by filling with incombustible materials.
- (e) All spaces back of combustible mantels shall be filled with incombustible materials.

505-2. Partitions in Multifamily Houses

In every building occupied as a multifamily house, unless sprinklered, partitions separating apartments, or apartments from public hallways, or apartments from other occupancies shall be $\frac{3}{4}$ -hour Fire Resisting Partitions.

505-3. Transoms

In buildings containing sleeping quarters, transoms or similar openings shall not be installed in walls or partitions separating public hallways from apartments and sleeping rooms.

505-4. Floors in Multifamily Houses

In every building occupied as a multifamily house, the floor construction immediately above those parts of the building occupied for business purposes shall have a fire resistance rating of not less than $\frac{3}{4}$ hour, unless such parts are sprinklered.

505-5. Cellar Ceilings

In buildings of Ordinary construction or Frame construction, except one-story buildings, the ceilings over cellars shall conform to the requirements for Fire Retardant Ceilings.

505-6. Wall and Ceiling Finish

In Group A buildings and Group B buildings, and in all Places of Assembly and Exitways therefrom, no combustible materials shall be used as interior wall or ceiling finish which is of such a nature that flame will spread over its surface more rapidly than over one-inch (nominal) wood boards covered with ordinary paint or varnish.

505-7. Boiler, Fuel and Janitor's Work Rooms in School Buildings

Walls and ceilings of rooms in school buildings containing heating plants, including fuel storage rooms and janitor's work rooms, if they are located adjoining or under pupil occupied spaces, shall have a fire resistance rating of not less than two hours. All doors connecting such rooms with other parts of the building shall be protected with approved self-closing fire doors. The room containing the heating plant shall have an outside entrance.

(Note: A door listed in the current edition of the Underwriters' Laboratories, Inc. List of Fire Protection Equipment and Materials as being approved for Class B situations shall be deemed satisfactory.)

SECTION 506. FIRESTOPPING

506-1. General

Firestopping shall be provided in buildings of Ordinary and Frame construction to cut off all concealed draft openings and form effectual fire barriers. Such firestopping shall be of wood two inches in nominal thickness, or of approved incombustible materials.

506-2. Furred Walls

When the walls are furred, the furred space shall be firestopped at floors, ceilings and roofs.

506-3. Partitions

- (a) Interior stud partitions shall be firestopped at the floors and ceilings of each story by a two-inch, nominal dimension, plate, the width of the stud, or the equivalent.
- (b) When sliding doors are pocketed in partitions, such pockets shall be completely firestopped at the top, bottom and ends.

506-4. Exterior Walls

Exterior walls of frame construction shall be properly firestopped at each floor level, at the top story ceiling level, at the roof level in the case of flat roofs, and at the foot of roof rafters in the case of sloping roofs.

506-5. Wainscoting and Paneling

Combustible wainscoting or paneling attached to plastered walls and partitions shall be firestopped at floor and ceiling, or at top and bottom.

506-6. Pipes, Shafting, Belts, Conveyors and Ducts

- (a) All openings around conduits, pipes or ducts shall be filled with approved incombustible material or shall be closed off by close fitting incombustible material at the ceiling and floor line or on each side of the wall.

- (b) All openings for belts, chutes and conveyors shall be provided with approved slotted doors, or be otherwise suitably protected.

SECTION 507. PROTECTION OF OPENINGS IN EXTERIOR WALLS

507-1. Buildings Affected

- (a) Openings in exterior walls of buildings listed below shall be protected as required by this Section:
 - (1) Buildings over 70 feet in height to the floor of the highest story, *or*
 - (2) Buildings over one story in height whose occupants are bedridden, or under legal restraint, or who, because of age or mental or physical infirmities, would ordinarily be unable to make quick exit in case of emergency, *or*
 - (3) Portions of buildings used as Places of Assembly.
- (b) Exceptions: Churches, Group E buildings and buildings of Frame and Unprotected Metal construction are exempt from the requirements of this Section.

507-2. Openings Affected

- (a) Approved fire windows or other approved protectives shall be installed in openings in exterior walls of buildings required to be protected when:
 - (1) They are less than 30 feet in a direct line from an opening in the wall of a building of Fireproof, Semi-fireproof, Heavy Timber, Ordinary or Noncombustible construction.
 - (2) They are less than 30 feet in a direct line from a building of Frame, or Unprotected Metal construction, *or*
 - (3) They are less than 30 feet distant from a roof of combustible construction or from an opening in a roof of any construction.
- (b) Exceptions: Such protection is not required when:
 - (1) The opening in question and the opening against which it is to be protected are in walls in the same plane and are facing in the same direction, *or*
 - (2) The opening in question is a show window, which does not extend above the first full story above grade.
- (c) For the purpose of this Section, any space within thirty feet devoted to use as a lumber yard or for the storage of comparable quantities of combustible material shall be considered as an exposing building.

507-3. Fire Shutters

When equipped with fire shutters, at least one in every three openings facing a street in each story shall have such shutters arranged to be readily opened from the outside. Distinguishing marks will be provided on these shutters.

507-4. Exit Openings

When fire doors or fire shutters are used on openings to Exitways they shall be so arranged as not to obstruct such Exitways.

507-5. Wired Glass

For the glazing of fire doors, when permitted, or of fire windows, only wired glass shall be used which shall be not less than one-quarter inch thick.

507-6. Closing of Protectives

Non-automatic fire doors, fire shutters and fire windows on exterior openings, when not required to be open, shall be kept closed by the occupant or occupants of the building having the use or control of them.

507-7. Installation and Approval

Fire doors, fire windows, fire shutters, window sprinklers and other protectives required by this Section shall be of approved types and installed in an approved manner. Devices enumerated in the "List of Inspected Fire Protection Equipment and Materials" issued by Underwriters' Laboratories, Inc., as revised from time to time, and listed for the purpose intended if installed in accordance with the provisions of the Standards of the National Fire Protection Association for the "Protection of Openings in Walls and Partitions against Fire," (N.B.F.U. Pamphlet No. 80) shall be deemed to be approved within the meaning of this Section.

SECTION 508. PROTECTION OF SHAFTWAYS

508-1. Application

The provisions of this Section shall apply to all shaftways hereafter constructed which are used for ventilation, light, elevator, pipes, or other purposes; provided that the provisions of this Section shall not apply to the shaftways used for stairways, moving stairways, ducts, flues, incinerator chutes and shaftways in Frame buildings and in Group C buildings of Ordinary construction extending from the ceiling of the top story to and above the roof.

508-2. Protection Required

- (a) All interior shaftways regulated by this Section shall be enclosed in the same manner as required by the provisions of Subsection 404-2 for interior stairways which are not required as means of egress, except that where there are no openings in the floors other than for the actual passage of pipes, and the space between such pipes and floor construction is sealed with incombustible material in accordance with Paragraph 506-6(a), no enclosure shall be required.

(Note: Hoist-way doors may be considered self-closing when the elevator cab cannot be moved from the opening in question unless the doors are closed.)

- (b) Shaftway enclosures shall have no openings other than those necessary for the purpose of the shaftway; provided that in shaftways for elevators there shall be at least one doorway in every thirty feet of the height of such shaftway. This shall not be construed as prohibiting window openings to the exterior of the building.
- (c) Every shaftway extending through the roof, which is not open to the air at the top, shall be covered at the top with a skylight of at least 10 percent of the area of the shaft in the top story and glazed with plain glass (preferably not greater than one-eighth inch in thickness); provided that the skylight herein required may be replaced

- by a window of plain glass, or an automatic vent, of equivalent area in the side of the shaft if the sill of such window or vent is not less than two feet above the roof.
- (d) A shaftway that does not extend through the roof shall have the top enclosed with a form of construction equal to the requirements for the walls of the shaftway in fire resistance rating.
 - (e) A shaftway that does not extend to the bottom of the building shall be enclosed at its lowest point with a floor construction of the same type as that required for the lowest floor to or through which it passes; provided that, in any case, it shall have a fire resistance rating of not less than $\frac{3}{4}$ hour.
 - (f) Not more than three elevators shall be placed in one shaftway enclosure.

SECTION 509. PROTECTION OF DUCTS

509-1. Standard Systems Using Ducts

Ductwork used in air conditioning, warm air heating, air cooling and ventilating systems that conform to generally accepted minimum standards of safety shall be enclosed to the extent specified in such standards when passing between two or more stories; provided that such enclosures need not have a fire resistance rating in excess of $\frac{3}{4}$ hour.

(Note: The Standards of the National Board of Fire Underwriters (N.B.F.U. Pamphlet No. 90), for the Installation of Air Conditioning, Warm Air Heating, Air Cooling and Ventilating Systems, as recommended by the National Fire Protection Association, shall be deemed to conform to generally accepted minimum standards of safety.)

509-2. Non-standard Systems Using Ducts

Ductwork connecting two or more stories in air conditioning, warm air heating, air cooling and ventilating systems that do not conform to generally accepted minimum standards of safety shall be enclosed in the same manner and to the same extent as required by the provisions of Subsection 404-2 for interior stairways which are not required as means of egress.

ARTICLE 6 - FIRE PROTECTION EQUIPMENT

SECTION 600. GENERAL

600-1. Design and Installation

All fire extinguishing equipment required by these Regulations, or for which credit is claimed under some provision of these Regulations, shall be designed and installed in accordance with good engineering practice. Compliance with the appropriate portions of the following Standards of the National Board of Fire Underwriters shall be deemed prima facie evidence of compliance with this Article, in so far as they apply. Applicable Standards of the National Board of Fire Underwriters, as recommended by the National Fire Protection Association, include:

- "Sprinkler Equipments" (N.B.F.U Pamphlet No. 13)
- "Fire Department Hose Connections for Sprinkler and Standpipe Systems" (N.B.F.U. Pamphlet No. 23)
- "Standpipe and Hose Systems" (N.B.F.U. Pamphlet No. 14)
- "Proprietary, Auxiliary and Local Systems for Watchman, Fire Alarm and Supervisory Service" (N.B.F.U. Pamphlet No. 72)

600-2. Materials

Materials, appliances, fittings and devices hereafter installed in fire extinguishing equipment required by this Article shall be of approved type and quality. Such materials, appliances, fittings and devices when currently approved by the Underwriter's Laboratories, Inc., and listed for the purposes intended shall be accepted as conforming to the requirements of this Section.

SECTION 601. SPRINKLER EQUIPMENTS

601-1. When Required

Approved automatic sprinkler equipments shall be installed and maintained as follows:

- (1) Buildings over two stories in height used for the manufacture or sale of combustible goods or merchandise and exceeding in area ten thousand square feet when of Fireproof or Semi-fireproof construction or seven thousand five hundred square feet when of other types of construction, shall be equipped with approved automatic sprinkler equipments or other approved automatic detection and extinguishing devices, when occupied or used on any one floor by 150 or more persons.
- (2) Basements and other stories with the floor located below grade and having floor areas exceeding five thousand square feet, when used for the manufacture or sale of combustible goods or merchandise, shall be equipped with approved automatic sprinkler equipments or other approved automatic detection and extinguishing devices, when occupied or used by 75 or more persons.
- (3) Building and other structures which, because of their location, construction and contained hazards present unusual hazards to life may, on the written order of the State Corporation Commission, be required to be equipped with an

approved system of automatic sprinklers or other approved automatic detection and extinguishing devices.

601-2. Water Supplies

Required sprinkler systems shall have at least one approved automatic water supply of adequate pressure, capacity and reliability.

ARTICLE 7 - ADDITIONAL PROVISIONS FOR SPECIAL OCCUPANCIES

SECTION 700. GENERAL

700-1. Purpose

The intent of this Article is to require supplemental or modified safeguards for life from fire in buildings which, due to their occupancy, present hazards not fully regulated by the preceding Articles. The requirements of the preceding Articles shall apply to all buildings regulated by this Article except as modified by the provisions of this Article.

SECTION 701. PLACES OF ASSEMBLY

701-1. Application

Places of Assembly shall conform to the requirements of this Section.

(Note 1: See Section 703 for Outdoor Places of Assembly.)

(Note 2: See Section 1701 for Existing Places of Assembly.)

701-2. Seating Arrangements

- (a) Except in gymnasiums, restaurants, night clubs, churches and other places of religious assembly, individual seats shall be provided for the persons seated therein.

(Note: See Section 703 for Outdoor Places of Assembly.)

- (b) The width of seat allotted for each person shall be not less than 18 inches.
- (c) Seats in rows, whether fixed or movable, shall, except in boxes or loges not exceeding 60 square feet in area, be not less than 30 inches apart from back to back measured in a horizontal direction.
- (d) When individual fixed seats are provided or required, the maximum number of seats in a row extending from one aisle to another shall be 16 and the maximum number of seats in a row extending from one aisle to a wall shall be 8, except that if the seatings are fixed chairs with self-rising seats so spaced that when the seats are raised there is an unobstructed space not less than 18 inches horizontal projection between the rows of seats, and doorways leading directly to exit corridors are provided not more than 5 feet apart along the sides of the auditorium, the number of seats in a row shall not be limited.
- (e) In Places of Assembly used regularly for theatrical, operatic or similar performances, or for the display of motion pictures, the seats, except in boxes or loges not exceeding 60 square feet in area, shall be fixed and shall be separated by arms.
- (f) In boxes or loges not exceeding 60 square feet in area, and in other locations where loose chairs are permitted, not more than one chair shall be provided for each 6 square feet of floor space occupied.

701-3. Aisles

- (a) Every aisle shall lead to an exit door, or to a cross aisle; that is, an aisle running parallel with the seat rows and leading to an exit door.

- (b) No point of a cross aisle shall have a clear width of less than 44 inches.
- (c) No point of a longitudinal aisle shall have a clear width of less than 33 inches.
- (d) A longitudinal aisle accommodating more than 180 persons, and leading to exits or cross aisles in one direction only, shall be widened uniformly in the direction of normal exit travel. The widest portion of the aisle shall be not less than as computed by the formula:

$$W = \frac{22 P}{120}$$

where W equals the required width in inches and P equals the total number of persons to be accommodated by the aisle.

- (e) A longitudinal aisle accommodating more than 180 persons, and leading to exits or cross aisles in both directions shall conform to (d) above, or shall be of constant width. When of constant width, the width shall be not less than as computed by the formula:

$$W = 16.5 + \frac{11 P}{120}$$

where W equals the required width in inches and P equals the total number of persons to be accommodated by the aisle.

- (f) There shall be no steps in any main floor aisle, except at the rear of the main floor in a stadium type theater. Steps in other aisles shall be the full width of the aisles. Stepped aisles shall not be construed as being stairways.
- (g) The maximum slope in aisles on the main floor shall be one in six for the first, second and third rows of seats from the rear, one in seven for the fourth, fifth, and sixth rows, one in eight for the seventh, eighth and ninth and one in ten for all remaining rows.

701-4. Galleries and Balconies

In galleries, balconies or other locations where seatings are arranged on platforms or successive tiers, and the height of the riser from one platform to another below and in front of it exceeds 21 inches, a substantial railing not less than 26 inches high shall be placed at the edge of the platform along the entire row of seats.

701-5. Stage

- (a) *General.* No stage for theatrical or similar performances, including drama, opera, vaudeville and the like, which requires or uses a curtain, portable or fixed scenery, light, mechanical appliances, or any of them shall be placed in a building heretofore or hereafter erected except in conformity with the appropriate provisions of this Subsection.
- (b) *Enclosure Walls.* (1) The stage shall be separated from all other parts of the building by masonry walls having a fire resistance rating of not less than 2 hours and with openings protected as required in Paragraph (c), (f) and (g) below; except that in motion picture theaters, school auditoriums, clubs and similar Places of Assembly where the stage or platform is without provisions for the vertical shifting of scenery, separation between the stage and the auditorium shall not be required. Required separating walls shall extend from the foundation to at least 4 feet above the roof, except where the roof is of Fireproof or Semi-

fireproof construction, in which case the walls shall be carried up tightly against the underside of the roof slab.

- (2) There shall be no window opening in the enclosure walls of such a stage within 5 feet of a lot line other than a street line.

(c) *Proscenium Wall Openings.* Each opening other than the proscenium opening in the wall which separates the stage from the auditorium shall be protected by an approved self-closing fire door of a type approved for use in Fire Partitions.

(Note: The use of a door listed in the current List of Fire Protection Equipment, Underwriters' Laboratories, Inc. as satisfactory for protection of openings in Class B situations, properly installed, will be acceptable.)

(d) *Appurtenant Rooms.* (1) Dressing rooms, scene docks, property rooms, and other rooms or compartments appurtenant to the stage shall be separated from the auditorium and stage by Fire Partitions if these spaces are greater than 150 square feet in total area.

- (2) In no case shall openings, other than the necessary doorways at the stage level, connect such rooms with the rest of the stage.

(e) *Stage and Dressing Rooms Exits.* The stage and dressing rooms shall be provided with one or more exit doors independent of the auditorium exit doors. Stage and dressing rooms or stage and auditorium may use the same exit passage, but the stage shall not be used as a part of the exitway from the dressing rooms nor the dressing rooms used as a part of the exitway from the stage. Except in school buildings, the stage may be used as part of the exitway from dressing rooms not exceeding 150 square feet in area.

(f) *Curtain.* The proscenium opening in the required separating partition between stage and auditorium shall be provided with an approved curtain for the protection of the opening in case of fire on the stage. When the proscenium opening is less than 60 feet in width, a curtain conforming to Chapter 41 of the 1949 Edition of the Uniform Building Code adopted by the Pacific Coast Building Officials Conference shall be deemed approved. For proscenium openings 60 feet in width or more, a curtain conforming to the requirements of Section 1201 of the 1949 Edition of the National Building Code recommended by the National Board of Fire Underwriters shall be deemed approved. Curtains not conforming to the above standards shall be submitted to the State Corporation Commission for approval prior to installation.

(Note: See Appendix C for Uniform Building Code curtain requirements. See Appendix D for National Building Code curtain requirements.)

(g) *Ventilators.* (1) Over a stage requiring separation from the auditorium there shall be provided one or more smoke ventilators in addition to any air change, ventilating, or air conditioning system. The smoke ventilators shall be of metal or other incombustible material, equipped with movable shutters or sash, having an aggregate clear area of not less than 1/8 the area of the stage, constructed to open automatically and instantly in case of fire by approved heat-actuated devices. Suitable means for manual operation shall be provided in addition.

- (2) If glass is used in the construction, only wired glass shall be used in such parts where the breaking of glass would cause it to fall on the stage.

- (3) Any air change, ventilating or air conditioning system serving the auditorium shall be independent of any such system serving the stage area of stages requiring separation from the auditorium. The system shall be provided with a smoke or fire detecting system arranged to stop the operation of the air systems automatically in case of fire, except that this does not apply to systems used solely for exhausting air to the outside.
- (h) *Lights.* (1) The troughs or frames for footlights and border lights shall be of incombustible materials.
 - (2) The suspension lines of border lights shall be on wire for at least 10 feet from the frames.
- (i) *Location of Electrical Switchboard.* The switchboard for the electrical equipment of the stage shall be so located that it will be accessible at all times, and will be protected from falling objects and from the storage or placing of stage equipment against it.

701-6. Extinguishing Equipment

- (a) Stages required to be separated from the auditorium shall be sprinklered under the roof of the stage, under the gridiron, the rigging loft and fly and tie galleries, under the stage, in dressing rooms, scene docks, workshops and storage rooms.
- (b) On stages required to be separated from the auditorium one approved 2½-inch standpipe outlet shall be provided on each side of the stage. Each outlet shall be equipped with approved 1½-inch hose and nozzle, the quantity of hose being sufficient to allow a stream to reach any portion of the stage section and in no case less than fifty feet.
- (c) One approved hand fire extinguisher suitable for extinguishing fires in ordinary materials shall be located on the stage at each side of the proscenium opening; a similar device shall be located accessible to but outside the projection booth.

701-7. Places of Assembly Combined with Other Occupancies

No Place of Assembly having a stage as described in Paragraph 701-5(a), above, or which is used for the projection of motion pictures from nitrocellulose film, shall be located within or attached to a building of other than Group A occupancy unless:

- (1) It is separated from such occupancy by wall, ceiling and floor construction having a fire resistance rating of not less than two hours, *or*,
- (2) Such other occupancy is equipped with an approved automatic sprinkler system.

701-8. Flameproofing Requirements

- (a) Use of combustible material for decorative purposes shall be kept to a minimum in Places of Assembly, and all such material, including curtains, draperies, artificial trees or other decorative material, but not including floors, walls or ceilings, shall be rendered flameproof. Such flameproofing shall be tested at intervals of not more than 6 months, and shall be renewed when found necessary.
 - (Note: See Subsection 505-6 for wall and ceiling requirements.)
- (b) On a stage requiring separation from the auditorium all scenery, drapes and sets used on the stage shall be coated or treated to render them flameproof.

SECTION 702. MOTION PICTURE PROJECTION

702-1. Application

In any building where motion pictures are projected from nitrocellulose film, the projection equipment and the storage and handling of such film shall conform to the requirements of this Section.

702-2. Projection Booths and Equipment

- (a) Motion picture projectors using nitrocellulose film shall be operated or set up for operation only within an approved enclosure, not less than 8 feet wide, 10 feet deep and 8 feet high for one projection machine, and not less than 14 feet wide, 10 feet deep and 8 feet high for 2 machines.
- (b) The walls and ceilings of the enclosure shall be of a form of construction having a fire resistance rating of not less than one hour. Only incombustible materials shall be used in the construction of the enclosure walls. All joints shall be sufficiently tight to prevent the discharge of smoke.
- (c) The enclosure shall have at least two exit doors, each not less than 30 inches wide and 6 feet high, protected by approved self-closing fire doors.
- (d) Two openings for each motion picture projector shall be provided; one for the projectionist's view (observation port) shall be not larger than 200 square inches, and the other through which the picture is projected (projection port) shall be not larger than 120 square inches. Where separate stereoptican, spot or flood light machines are installed in the same enclosure with picture machines, not more than one opening for each such machine shall be provided for both the operator's view and for the projection of the light, but two or more machines may be operated through the same opening; such openings shall be as small as practicable and shall be capable of being protected by approved automatic shutters.
- (e) Each opening shall be provided with an approved gravity shutter set into guides not less than one inch at sides and bottom, and overlapping the top of the opening by not less than one inch when closed. Shutters shall be of not less than 10-gauge iron or its equivalent, or of ¼-inch hard asbestos board. Guides shall be of not less than 10-gauge iron or its equivalent. Each shutter shall have a fusible link above it, and there shall also be one located over each upper projector magazine which, upon operating, will close all the shutters. There shall also be provided suitable means for manually closing all shutters simultaneously from a point within the projection room near each exit door. Shutters on openings not in use shall be kept closed.
- (f) All shelves, furniture and fixtures within the enclosure shall be constructed of incombustible material.
- (g) Projection machines shall be adequately supported and secured against overturning.

702-3. Ventilation

- (a) Ventilation shall be provided by one or more mechanical exhaust systems which shall draw air from each arc lamp housing and from one or more points near the ceiling. Systems shall exhaust to outdoors either directly or through an incombustible flue used for no other purpose. Exhaust capacity shall be not less than 15 cubic feet nor more than 50 cubic feet per minute for each arc lamp plus 200 cubic feet per minute for the room itself. Systems shall be controlled from within the enclosure and have pilot lights to indicate operation. The exhaust system serving the projection room may be

extended to cover rooms associated therewith, such as rewind rooms, but ventilation of these rooms shall not be connected in any way with ventilation or air conditioning systems serving other portions of the building.

- (b) Exhaust ducts shall be of incombustible material and shall either be kept one inch from combustible material or covered with ½ inch of incombustible heat insulating material.
- (c) Fresh air intakes other than those direct to the open air shall be protected by approved fire shutters arranged to operate automatically with the port shutters.

SECTION 703. OUTDOOR PLACES OF ASSEMBLY

703-1. Flameproofing of Tents

- (a) All tents occupied for public assembly shall be effectively flameproofed. In addition, combustible material for decorative purposes in all tents used as Places of Assembly shall conform to Paragraph 701-8(a), above.
- (b) Any official authorized to enforce these Regulations may require field tests of the required flameproofing, or he may accept the report of tests made by other administrative officials or by a recognized testing laboratory.

703-2. Other Outdoor Places of Assembly

Otherwise than in Paragraph 703-1, above, Outdoor Places of Assembly such as grandstands, stadiums, reviewing stands, etc. are not covered by these Regulations.

SECTION 704. GARAGES

704-1. Application

The provisions of this Section apply to buildings occupied as garages.

704-2. Garages Combined with Other Occupancies

- (a) Except as permitted in paragraph (b) below, and for fire stations, no garage shall be located in or attached to a Group A, Group B, Group C or Group D building of other than industrial occupancy unless:
 - (1) The garage is separated from such other occupancies by Fire Partitions and by floors and ceilings of Fireproof or Semi-fireproof construction, *or*
 - (2) The garage area is equipped with an approved automatic sprinkler system.
- (b) A garage not exceeding 3,000 square feet in area and used only for storage of passenger automobiles or trucks of one ton or less capacity may be located in or attached to a Group A, Group B, Group C or Group D building of other than industrial occupancy when:
 - (1) The garage area is separated from such occupancy by wall, floor and ceiling construction of at least ¾-hour fire resistance with all connecting openings protected by approved self-closing fire doors as specified for ¾-hour Fire Resisting Partitions, *or*
 - (2) The garage area is equipped with an approved automatic sprinkler system.

704-3. Ventilation

All garages having one or more floors below grade shall have such stories continuously ventilated by a mechanical ventilating system with positive means for both the inlet and exhaust of at least one cubic foot of air per minute per a square foot of floor area. Controls for the exhaust and inlet fans shall be close to the entrance door. The ventilating equipment may be combined with the heating system, provided that no air shall be recirculated.

704-4. Miscellaneous

Ramps connecting floors of garages need not be enclosed and protected in the various stories if the garage is protected with automatic sprinklers or if ramps are around an open air shaft extending through the roof, or if fifty percent of the wall area of two sides of the garage is open to the air at each story above the first floor, or above the basement floor if a basement is provided. Suitable egress provisions shall be provided for persons from each floor.

PART TWO

Existing Buildings

1981 Edition;

Buildings Constructed Before April 12, 1949

ARTICLE 11 - ADMINISTRATION

SECTION 1100. SCOPE

1100-1. Short Title

These regulations shall be known and may be cited as the "Virginia Fire Safety Regulations." Except as otherwise indicated, "Regulations" used herein shall mean "Virginia Fire Safety Regulations", "Law" used herein shall mean Chapter 493, Acts of Assembly, 1948, entitled "Virginia Fire Hazards Law," and "Commission" shall mean "State Corporation Commission."

1100-2. Application

- (a) These Regulations shall apply to all public buildings as defined by Chapter 493, Acts of Assembly, 1948, as amended by Chapter 605, Acts of Assembly, 1952, in which the term "public building" means and includes any building or structure, permanent or temporary, which is used or occupied, or to be used or occupied, by ten or more persons who are employed, lodged, housed, assembled, served, entertained or instructed therein and, without limiting the foregoing, includes hotels, schools and colleges, hospitals of all kinds, asylums, mercantile establishments, office buildings, apartment houses, theaters, restaurants, auditoriums, stadiums, gymnasiums, armories, dance halls, factories, work shops, lodges, meeting rooms, manufacturing and processing establishments, and all other buildings and structures of same or similar character or of same or similar use; including buildings owned and occupied by the State or by any of its political subdivisions; provided however, that in any city having a population according to the last official census of more than 200,000 people, no building or structure as aforesaid shall be included in the term "public building" as aforesaid, unless such building or structure as aforesaid is so used or occupied by 20 or more persons as aforesaid. Unless specifically noted, these Regulations shall not apply to 1, 2, or 3 family dwellings.
- (b) Unless otherwise noted, Articles 1, 2, 3, 4, 5, 6, and 7 (Part One) of these Regulations shall apply only to buildings hereafter erected or equipment hereafter installed, and Articles 11, 12, 13, 14, 15, 16, and 17 (Part Two) shall apply only to buildings heretofore erected or equipment heretofore installed.
- (c) Nothing in these Regulations shall be construed to lower in any way existing or future requirements of any political subdivision of the State respecting fire safety in public buildings.
- (d) Where a requirement of these Regulations is more restrictive than the corresponding requirement of any political subdivision, the requirement of these Regulations shall govern.
- (e) Any table of contents, index, appendix, or explanatory reference note accompanying or appearing in these Regulations shall not be considered a part of the Regulations.

1100-3. Effective Dates

- (a) The effective date of any provision of these Regulations shall be 90 days from the date of its adoption in the case of buildings hereafter erected or equipment hereafter installed.

- (b) The effective date of any provision of these Regulations shall be one year from the date of its adoption in the case of existing buildings or equipment heretofore installed.
- (c) Buildings or equipment on which construction or installation has been commenced before a provision applying to buildings hereafter erected or equipment hereafter installed becomes effective shall not be required to conform to such provision, provided the work is completed within two years from the effective date. Such buildings and equipment shall, nevertheless, meet all provisions applying to existing buildings.
- (d) In any case of extreme hazard to life in an existing building the Commission may make any rule applicable thereto immediately effective and may give the owner thereof a reasonable time to comply with the rule.

(Note: The Virginia Fire Safety Regulations were adopted April 12, 1949.)

SECTION 1101. ENFORCEMENT

1101-1. General

These Regulations shall be enforced as prescribed by Chapter 493, Acts of Assembly, 1948.

(Note: See Appendix A, "Virginia Fire Hazards Law.")

1101-2. Chief Fire Marshal

Subject to the supervision and direction of the State Corporation Commission, the Chief Fire Marshal shall be directly responsible for the proper exercise of the functions and for the performance of the duties of the Commission in connection with the enforcement of Chapter 493, Acts of Assembly, 1948, and of these Regulations.

1101-3. Local Agencies

The powers and duties of local enforcement agencies respecting enforcement of these Regulations shall be as prescribed by law.

SECTION 1102. MODIFICATION

1102-1. When Regulations May Be Modified

Where the purpose of any provision of these Regulations, as it pertains to safety to life and property from fire, can be fulfilled by other means in the case of a specific building, the State Corporation Commission may modify the provision to permit certain specified alternatives.

January 15, 1979 Amendment:

1102-1. When Regulations May be Modified

Where the purpose of any provision of these Regulations, as it pertains to safety to life and property from fire, can be fulfilled by other means in the case of a specific building, the Chief Fire Marshal may modify the provision to permit certain specified alternatives.

1102–2. Records

The application for modification and the final decision of the Chief Fire Marshal shall be in writing and shall be officially recorded in the permanent records of Office of State Fire Marshal.

1102–3. Appeal to Review Board

Any person aggrieved by a decision of the Chief Fire Marshal upon an application for a modification of the Regulations, whether or not a previous party to the decision, may apply for review to the State Building Code Technical Review Board. Application for review shall be made to the Review Board within 30 days of the filing of the Chief Fire Marshal's decision in the office of Office of State Fire Marshal.

1102–4. Court Review

An appeal from the Review Board shall be in accordance with the provisions of Sections 9-6.14:15 through 9-6.14:19 of the Code of Virginia (1950), as amended.

ARTICLE 12 - DEFINITIONS

SECTION 1200. DEFINITIONS

- (a) Unless otherwise expressly stated, the following terms shall have meanings indicated in this Section.
- (b) Words used in the present tense include the future; words in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural the singular.
- (c) Where terms are not defined in this Section they shall have their ordinarily accepted meanings or such as the context may imply.

"ALLEY" means any public space or thoroughfare 20 feet or less in width which has been dedicated or deeded for public use.

"ALTERATION", as applied to a building or structure, means a change or rearrangement in the structural parts or in the exit facilities; or an enlargement, whether by extending on a side or by increasing in height; or the moving from one location or position to another. The term "ALTER", in its various moods and tenses and its participial forms, refers to the making of an alteration.

"APARTMENT" means a room, or a suite of two or more rooms, in a Group C building occupied as the home or residence of an individual, family or household.

"APARTMENT HOUSE" means a building in which three or more apartments are located. Rooming houses are considered to be apartment houses.

"APPROVED", as applied to a material, device, mode of construction or as otherwise used in these Regulations means approved by the State Corporation Commission.

(Note: Equipment listed as satisfactory for specific purposes by nationally recognized testing laboratories (such as the Underwriters' Laboratories, Inc., the Factory Mutual Laboratories, and the American Gas Association), when installed and used for the purposes intended, will be accepted as approved, unless specifically prohibited elsewhere in these Regulations.)

"APPROVED MASONRY" means masonry constructed of brick, stone, concrete, hollow block, solid block, or other material, or a combination of these materials as approved by the State Corporation Commission. (See Section 1500.)

"AREA", as applied to the dimensions of a building, means the maximum horizontal projected area of the building at grade.

"AUTOMATIC", as applied to a fire door or other opening protective, means normally held in an open position and automatically closed by a releasing device that is actuated by abnormal high temperature, by a predetermined rate of rise in temperature, or by the presence of smoke.

"BALCONY", as applied to a theater or auditorium, means the seating tier next above the main floor.

"BASEMENT" means that story of a building the floor of which is not less than two feet below grade and the ceiling of which is not less than four feet and six inches, but not more than seven feet and six inches, above grade.

“BUILDING” means a public building as defined in Paragraph 1100-2(a). The term “Building” shall be construed as if followed by the words “or part thereof”. When a building is divided by a Fire Wall or Fire Walls into two or more sections, each section shall be regarded as a separate building.

“CELLAR” means that story of a building the ceiling of which is entirely below or less than four feet and six inches above grade.

“CONCRETE” means a mixture of portland cement, aggregate and water, of such materials, proportions, and manipulation as to give specified results.

“ELEVATOR” means a device within or in connection with a building used for carrying persons or things upward or downward; and includes dumbwaiter and similar devices, but does not include moving stairway.

“EXISTING” means heretofore erected or installed.

“EXIT DOORWAY” means a doorway leading into an Exitway or to a street or to an open place giving safe access to a street.

“EXIT FACILITY” – See Subsections 1400-2 and 401-1.

“EXITWAY” means the necessary combination of “Exit Facilities” through which persons may proceed safely in case of emergency from any floor of a building to the main entrance floor or to a street or an open space which provides safe access to a street; provided that Exitways from the main entrance floor shall discharge directly to a street or an open space which gives safe access to a street.

“FIRE DIVISION” – A building considered to be located in a fire division when, due to segregation by open space, Fire Walls or other means of protection, a fire therein, under normal conditions, would burn itself out without spreading to buildings or combustible materials outside the fire division, and in which a fire originating in buildings or combustible materials outside such fire division would burn itself out without spreading to a building in the fire division.

“FIRE DOOR” means a door and its assembly, so constructed and assembled in place as to give the specified protection against the passage of fire.

“FIRE PARTITION” – See Section 502.

“FIRE RESISTANCE RATING” means the time in hours that the material or construction will withstand the standard fire exposure as determined by a fire test made in conformity with the “Standard Methods of Fire Tests of Building Construction and Materials” of the American Standards Association, or any rating accepted by the Commission for a type of construction. Fire resistance ratings for materials or constructions which are set forth in Appendix B or in any of the Codes or Standards recognized by Section 1500 will be accepted by the Commission. Materials or construction rated as “combustible” shall not be acceptable for specified rating of over one hour.

“FIRE WALL” means a wall constructed in accordance with Section 1501, for the purpose of subdividing a building or separating buildings to restrict the spread of fire and which starts at the foundation and extends continuously through all stories.

“FIREPROOF CONSTRUCTION” – See Subsection 1301-1.

“FLAMMABLE LIQUID” means a liquid having a flash point not greater than 200 degrees, Fahrenheit.

“FLAMEPROOF”, as applied to decorations, curtains, draperies, scenery, tents, woodwork or other normally combustible materials, means treated so it will not propagate flame.

“FLOOR AREA” means a floor space enclosed by walls or partitions, provided that where the building has any side open the floor line shall determine the limit of that side. In the case of structures such as stadiums which are neither enclosed nor roofed over, the floor area shall be considered as the projected area on a horizontal plane.

“FRAME CONSTRUCTION” – See Subsection 1301-1.

“GALLERY” means any seating tier above the balcony in a Place of Assembly.

“GARAGE” means a building in which a motor vehicle containing flammable liquid or flammable gas in its fuel storage tank is stored, housed or kept.

“GRADE”, with reference to a building, means, when the curb level has been established, the mean elevation of the curb level opposite those walls that are located on, or parallel with and within fifteen feet of, street lines; or, when the curb level has not been established, or all the walls of the building are more than fifteen feet from street lines, “grade” means the mean elevation of the first ground surface adjoining the building along such wall.

“GROUP A BUILDING” – See Section 1300.

“GROUP B BUILDING” – See Section 1300.

“GROUP C BUILDING” – See Section 1300.

“GROUP D BUILDING” – See Section 1300.

“GROUP E BUILDING” – See Section 1300.

“HALLWAY” means an enclosed area within a building devoted to the horizontal movement of persons or goods.

“HEAVY-TIMBER CONSTRUCTION” – See Subsection 1301-1.

“HEIGHT”, as applied to a building, means the vertical distance from grade to the highest finished roof surface in the case of flat roofs or to a point at the average height of roofs having a pitch of more than one foot in four and one-half feet; “height” of a building in stories does not include basement and cellar stories.

“HEIGHT”, as applied to a court, means the vertical distance from the level of the floor of the lowest story served by that court to the level under consideration.

“HEIGHT”, as applied to a story, means the vertical distance from top to top of two successive tiers of floor beams or finished floor surfaces.

“HEIGHT”, as applied to a wall, means the vertical distance to the top measured from the foundation wall, or from a girder or other immediate support of such wall.

“HEREAFTER”, as used in connection with any provision of these Regulations, present or future, means after the date of adoption of such provision.

“HERETOFORE”, as used in connection with any provision of these Regulations, present or future, means before the date of adoption of such provision.

“HOTEL” means a building in which rooms are rented for temporary occupancy for lodging purposes and includes commercial hotels, resort hotels, tourist courts, lodging houses and buildings similarly occupied.

“LODGING HOUSE” – See “Hotel”.

“LOT” means a portion or parcel of land considered as a unit, devoted to a certain use or occupied by a building or a group of buildings that are united by a common interest or use, and the customary accessories and open spaces belonging to the same.

“LOT LINE” means a line dividing one lot from another, or from a street or other public space.

“MASONRY” – See “Approved Masonry”.

“MEZZANINE” means a partial floor.

“MULTIFAMILY HOUSE” means a building occupied as the home or residence of individuals, families or households living independently of each other, of which 4 or more are doing cooking within their apartments; including tenement house, apartment house, flat. A row of 4 or more single family houses not separated by Fire Walls is considered to be a multifamily house.

“OCCUPIED”, as applied to a building, shall be construed as though followed by the words “or intended, arranged or designed to be occupied.”

“¾-HOUR FIRE RESISTING PARTITION” – See Section 1503.

“ORDINARY CONSTRUCTION” – See Subsection 1301-1.

“PENT HOUSE” means an enclosed structure other than a roof structure, located on the roof, extending not more than twelve feet above the roof.

“PLACE OF ASSEMBLY” means a room or space in which one hundred or more persons are congregated for religious, recreational, educational, political, social or amusement purposes or for the consumption of food or drink. Such room or space shall include any occupied appurtenant rooms or space.

“PROSCENIUM WALL” means the wall which separates the stage section of a building from the auditorium.

“PUBLIC BUILDING” – See Paragraph 1100-2(a).

“REPAIR” means the replacement of existing work with the same kind of material used in the existing work, not including additional work that would effect the structural safety of the building, or that would affect and change required exit facilities, or that would affect a vital element of an elevator, gas piping, wiring or heating installation, or that would be in violation of a provision of these Regulations.

“REQUIRED” means required by some provision of these Regulations.

“ROOF STRUCTURE” means a structure above the roof of any part of a building enclosing a stairway, tank, elevator machinery or ventilating apparatus, or such part of a shaft as extends above the roof.

“ROOMING HOUSE” – See “Apartment House.”

“SELF-CLOSING”, as applied to a fire door or other opening protective, means normally closed and equipped with an approved device which will insure closing after having been opened for use.

“SEMI-FIREPROOF CONSTRUCTION” – See Subsection 1301-1.

“SHAFTWAY” means the space formed by the vertical projection between unpierced floors or roof of an opening in any intermediate floor or floors.

“SOLID BLOCK” means a building unit of burnt clay, concrete, or other approved incombustible material the gross cubic content of which is not less than 50 percent greater than the standard size of brick, and in which there are no cellular spaces, not including the scoring of the face, exceeding in the aggregate 25 percent of the gross cubic content of the unit.

“SPRINKLERED” means equipped with an approved automatic sprinkler system, properly maintained.

“STAIRWAY” means one or more flights of stairs and the necessary landings and platforms connecting them, to form a continuous and uninterrupted passage from one story to another in a building or structure.

“STANDARD FIRE TEST” means the fire test formulated under the procedure of the American Standards Association as “American Standard” and designated as American Standard A2.1-1942.

“STORAGE BUILDING” – See Subsection 1300-1.

“STORY” means that part of a building between a floor and the floor or roof next above; provided that such space above a mezzanine, the area of which is 25 percent or less of the area of the floor below, is not considered as a separate story. Basements and cellars are stories for all purposes of these Regulations except the computation of “height” in stories.

“STREET” means any public thoroughfare (street, avenue, boulevard, park) or space more than 20 feet in width, which has been dedicated or deeded for public use.

“STREET LINE” means a lot line dividing a lot from a street.

“UNPROTECTED METAL CONSTRUCTION” – See Subsection 1301-1.

“VERTICAL OPENING” means a communicating opening between two stories of a building.

“WALLS”:

“Bearing Wall” means a wall which supports any vertical load in addition to its own weight.

“Curtain Wall” means a non-bearing wall between columns or piers and which is not supported by girders or beams.

“Foundation Wall” means a wall below the first floor extending below the adjacent ground level and serving as support for a wall, pier, column or other structural part of a building.

“Non-Bearing Wall” means a wall which supports no load other than its own weight.

“Panel Wall” means a non-bearing wall in skeleton construction, built between columns or piers and wholly supported at each story.

“Party Wall” means a wall used or adapted for joint service between two buildings.

ARTICLE 13 - CLASSIFICATIONS AND RESTRICTIONS

SECTION 1300. CLASSIFICATION OF OCCUPANCIES

1300-1. Classes Designated

- (a) For the purpose of these Regulations, buildings are classified, with respect to occupancy and use, as Group A, Group B, Group C, Group D and Group E.
- (b) "GROUP A BUILDING" means a building in which persons congregate for civic, political, educational, religious, social or recreational purposes; including among others,

armories	court houses	museums
assembly halls	dance halls	passenger stations
auditoriums	exhibition buildings	recreation piers
bath houses	grandstands	restaurants
bowling alleys	gymnasiums	schools
churches	lecture halls	skating rinks
city halls	libraries	stadiums
club rooms	lodge rooms	theaters
colleges	motion picture theaters	

- (c) "GROUP B BUILDING" means a building in which persons are harbored to receive medical, charitable or other care or treatment, or in which persons are held or detained by reason of public or civic duty, or for correctional purposes; including among others,

asylums	jails	school, orphanage, and
homes for the aged	nurseries	other dormitories for
hospitals	penal institutions	children below high
houses of correction	reformatories	school age
infirmaries	sanitariums	

- (d) "GROUP C BUILDING", except when classed as a Group B building, means a building in which sleeping accommodations are provided; including among others,

apartments	hotels	school, orphanage, and
club houses	lodging houses	other dormitories for
convents	multifamily houses	children of high
	tenements	school age or older

- (e) "GROUP D BUILDING" means a building occupied for the transaction of business, for the rendering of professional services, for the display or sale of goods, wares or merchandise, or for the performance of work or labor; including among others,

bakeries	laboratories	stores
banks	laundries	telephone exchanges
factories	markets	work shops
ice plants	office buildings	

- (f) "GROUP E BUILDING" means a building for the housing, except for purely display purposes, of airplanes, automobiles, railway cars or other vehicles of transportation, for the sheltering of horses, live stock or other animals, or exclusively for the storage of

goods, wares or merchandise, not excluding in any case offices incidental to such uses; including among others,

freight depots
garages

grain elevators
hangars

storage warehouses

1300-2. Mixed Occupancy

In case a building is occupied for two or more purposes not included in one class, the provisions of these Regulations applying to each class of occupancy shall apply to such parts of the building as come within that class; and if there should be conflicting provisions, the requirements securing the greater safety shall apply.

1300-3. Doubtful Classification

In case a building is not specifically provided for, or where there is any uncertainty as to its classification, its status shall be fixed by the State Corporation Commission, giving due regard to safety.

SECTION 1301. CLASSIFICATION OF CONSTRUCTION

1301-1. Types Designated

- (a) For the purposes of these Regulations, construction as used in buildings shall be classified as follows. The order of classification is from most restrictive to least restrictive.
- (1) Fireproof
 - (2) Semi-fireproof
 - (3) Heavy Timber
 - (4) Ordinary
 - (5) Noncombustible
 - (6) Frame
 - (7) Unprotected Metal
- (b) "FIREPROOF" construction, as applied to a building, means that in which the structural members, including interior and exterior bearing walls and exterior non-bearing walls, are of approved incombustible construction having the necessary strength and stability and having a fire resistance rating of not less than shown in Table 1. A combustible roof may be used when it is protected by an approved automatic sprinkler system and the ceiling of the top story is of Fireproof construction.
- (c) "SEMI-FIREPROOF" construction, as applied to a building, means that in which the structural members, including interior and exterior bearing walls and exterior non-bearing walls, are of approved incombustible construction having the necessary strength and stability and having a fire resistance rating of not less than shown in Table 1. A combustible roof may be used when it is protected by an approved automatic sprinkler system and the ceiling of the top story is of Semi-fireproof construction.
- (d) "HEAVY TIMBER" construction, as applied to a building, means that in which the exterior walls and bearing walls are of approved masonry or reinforced concrete and in which the interior structural elements, including columns, floors, and roof construction,

- consist of an approved assembly of heavy timbers with smooth flat surfaces assembled to avoid thin sections, sharp projections and concealed or inaccessible spaces, or are of incombustible materials protected to have a fire resistance rating of not less than $\frac{3}{4}$ hour, and in which all structural members which support masonry walls shall have a fire resistance rating of not less than three hours.
- (e) "ORDINARY" construction, as applied to a building, means that in which exterior walls and bearing walls are of approved masonry or reinforced concrete and in which the structural elements are wholly or partly of wood of smaller dimensions than required for Heavy Timber construction, or of other materials not protected as required for Heavy Timber construction.
 - (f) "NONCOMBUSTIBLE" construction, as applied to a building, means that in which all structural members including walls, floors, roofs and their supports, are of steel, iron, concrete, or of other incombustible materials, and in which the exterior walls have not less than a two-hour fire resistance rating as tested for an interior and an exterior fire.
 - (g) "FRAME" construction, as applied to a building, means that in which walls and interior construction are wholly or partly of wood.
 - (h) "UNPROTECTED METAL" construction, as applied to a building, means that in which the structural supports are unprotected metal and in which the roofing and walls or other enclosures are of sheet metal, or of other incombustible materials, or of masonry deficient in thickness or otherwise not conforming to approved masonry.

TABLE 1
REQUIRED FIRE RESISTANCE RATINGS OF STRUCTURAL ELEMENTS IN HOURS

STRUCTURAL ELEMENT		TYPE OF CONSTRUCTION	
		Fireproof	Semi-Fireproof
EXTERIOR BEARING WALLS		4	3
EXTERIOR NON-BEARING WALLS, when having the following distance to a lot line or to another structure, whichever is nearer, except that measurements may be taken from opposite sides of streets.	Less than 6 ft.	4	3
	6 ft. or more but less than 11 ft.	3	2
	11 ft. or more but less than 21 ft.	2	1½
	21 ft. or more but less than 30 ft.	1½	1½
	30 ft. or more	0	0
INTERIOR BEARING WALLS & PARTITIONS		4	3
COLUMNS, GIRDERS, BEAMS, TRUSSES and similar members other than Roof Trusses.	Supporting masonry or bearing walls	3*	2*
	Supporting one floor	3	2
	Supporting more than one floor	4	3
FLOOR CONSTRUCTION		3	2
ROOF CONSTRUCTION AND ROOF TRUSSES AND FRAMING, when height to lower chord from highest floor, balcony or mezzanine is:	15 ft. or less	2	1½
	More than 15 ft. but less than 20 ft.	¾	¾
	20 ft. or more	0	0

*But not less than the required fire resistance of the wall supported.

1301-2. Partial Compliance

Nothing in these Regulations shall require full compliance with a type of construction, if, under these Regulations, a less restrictive type of construction is permitted; but no building shall be deemed of a given type of construction unless it conforms with all specific provisions of these Regulations applying to that type.

SECTION 1302. RESTRICTIONS ON TYPES OF CONSTRUCTION

1302-1. Change of Occupancy

No change in occupancy of a building is permitted which would result in violation of the height limitation for a building hereafter erected, provided the Commission may authorize such a change of occupancy when it involves a move from a more hazardous building and the original building is not thereafter used for any purpose in violation of the height limitation for a building hereafter erected.

(Note: See Article 3 for height restrictions for new construction.)

1302-2. Special Occupancies

- (a) Any building used or converted to use as a Place of Assembly which does not comply with Paragraphs 302–2(a) and (b), and which is of Ordinary, Non-combustible or Heavy Timber construction, and has seats or capacity for less than 300 persons on tier or tiers above the main floor, may be continued in use provided:
 - (1) All other applicable provisions of these Regulations for existing buildings are met, and
 - (2) No stage therein is equipped for the vertical shifting of scenery, and
 - (3) All remaining scenery, stage curtains and stage drapes are maintained flameproof.
- (b) Any other building used or converted to use as a Group A or Group B building shall comply with Subsection 302–2, or shall be altered by direction of the Commission to the minimum extent necessary to provide reasonable safety to life. Such alterations may include:
 - (1) Reduction in size or capacity.
 - (2) Elimination of hazardous features.
 - (3) Reduction in amount of combustible contents.
 - (4) Provision of additional means of egress.
 - (5) Other measures deemed necessary by the Commission.

SECTION 1303. HEIGHT RESTRICTIONS

1303-1. Alterations

No building shall hereafter be altered so as to exceed the limits of height fixed by Article 3 for buildings hereafter erected.

(Note: See Table 2 in Section 303.)

SECTION 1304. ADDITIONS

1304-1. General Requirements for Additions

Additions hereafter made to existing buildings shall conform to the requirements for new construction.

1304-2. When Additions are Prohibited and Fire Walls are Required

- (a) No addition shall hereafter be made to a building when the building being added to exceeds the height limits for new construction unless the addition is protected therefrom by a Fire Wall.
- (b) No addition shall hereafter be made to a building if the addition will exceed the height limits for new construction for the occupancy classification of the building being added to unless the latter is protected from the addition by a Fire Wall.

(Note: See Section 1501 for construction of Fire Walls.)

1304-3. Exits from Additions

Additions hereafter erected shall have means of egress conforming to Article 4.

(Note 1: See Paragraph 402–4(b) for an exception to this rule for school and Group B buildings.)

(Note 2: Under this rule it would be permissible for an addition to make use of surplus exit capacity in the older building if the older Exitways meet all the requirements of Article 4 as to location, enclosure, etc.)

1304-4. When Additions Must be Protected by Fire Partitions

When a three-story or higher addition is hereafter made to a three-story or higher building, the addition shall be separated therefrom by a Fire Partition unless the stairways, elevator and dumbwaiter shafts and other shaftways in the existing building other than ducts, flues and incinerator chutes are enclosed with ¾-hour Fire Resisting Partitions to the extent necessary to prevent a fire originating on any floor from spreading to any other floor.

ARTICLE 14 - MEANS OF EGRESS

SECTION 1400. GENERAL

1400-1. Application of Article

Every building heretofore erected shall be provided with means of egress adequate for the safety of the occupants. Such means of egress shall not provide less safety to the occupants than that obtained by compliance with the provisions of this Section.

1400-2. Meaning of Terms

Terms used in this Article shall have the same meanings as used in Article 4 unless clearly indicated otherwise.

SECTION 1401. ARRANGEMENT

1401-1. Discharge of Stairways

- (a) Exitways may discharge into the first story provided at least one Exitway in buildings over 4,000 square feet in area, and in buildings required to have more than one Exitway, shall discharge directly to the outside; and further provided that Exitways from Places of Assembly of which any part is located below grade shall also discharge directly to the outside. These requirements shall not apply to sprinklered buildings or to buildings of Fireproof or Semi-fireproof construction.
- (b) Exitways required to discharge directly to the outside may discharge into lobbies, foyers and similar spaces which connect directly to the outside when such spaces are of a size and character which do not constitute a serious life hazard in case of fire and when:
 - (1) They are constructed as Exit Hallways, *or*
 - (2) The adjoining rooms are sprinklered, *or*
 - (3) The adjoining rooms are cut off by $\frac{3}{4}$ -hour Fire Resisting Partitions.

SECTION 1402. NUMBER OF EXITWAYS

1402-1. From Stories

Every story shall have at least one Exitway and every story in which the number of occupants would require for new buildings more than 44 inches of exit width shall have at least two separate Exitways, except that in any building of Fireproof or Semi-fireproof construction and in any building of other construction not over two stories in height, and in any sprinklered building, a single Exitway may be used provided it and the other floor openings are protected with enclosures having a fire resistance rating of not less than $\frac{3}{4}$ hour, with all openings therein protected as specified for such enclosures in Subsection 1404–4, and the distance to the Exitway conforms with the provisions of Subsection 1403–1.

1402-2. Places of Assembly

- (a) Every room used as a Place of Assembly shall have at least two Exit Doorways.

- (b) Every Place of Assembly having a capacity greater than 200 persons shall have Exitways conforming as to number and width with Paragraph 402–2(b) and Subsection 404–4. In applying Subsection 404–4, a stairway 40 inches wide may be accepted as two units.

1402-3. Residence Occupancy Located Above a Business Occupancy

Residence occupancies located above a business occupancy shall be provided with an Exitway in addition to any extending through the business area.

1402-4. School Buildings and Group B Buildings

Group B occupancies and school buildings shall be provided with at least two Exitways, except that neither this requirement nor any other requirement for multiple Exits shall apply to buildings occupied by persons under legal restraint.

(Note: The term “persons under legal restraint” applies only to persons who are of sound mind and are not bedridden.)

SECTION 1403. LOCATION OF EXITWAYS

1403-1. General

The number and location of Exitways shall be such that it will not be necessary to travel more than a distance of 125 feet from the door of any room, or from any point on a floor not divided into rooms, to reach the nearest Exitway, except that in office buildings, and in sprinklered buildings, and in buildings of Fireproof or Semi-fireproof construction, and in buildings equipped with an approved automatic fire alarm system, such travel distance may be increased 50 percent.

SECTION 1404. INTERIOR EXIT STAIRWAYS

1404-1. Minimum Requirements for Existing Interior Exit Stairways

- (a) The Interior Exit Stairway in one of the Exitways from any story or stories occupied by a total of six or more persons shall have treads not less than 7 inches in width, exclusive of nosing, and risers not higher than 9½ inches nor more than 1.2 times the width of tread. Winder treads shall have a width of not less than 6 inches measured one foot from the narrow end. This paragraph shall not be construed as modifying the pitch and tread requirements for any new Interior Exit Stairway construction in existing buildings.
- (b) All Interior Exit Stairways shall be guarded at the sides by well-secured balustrades or other acceptable guards wherever such are needed for the safety of users, and shall have a handrail on at least one side when the stairway exceeds 44 inches in width.

1404-2. Stairways Which Shall be Protected

All interior stairways, including moving stairways, shall be enclosed in accordance with Subsections 1404-3 and 4 below, except that stairways as follows shall be exempt from such requirements.

- (1) Stairways not required to be enclosed in new construction.

(Note: See Paragraph 404-2(d).)

- (2) Stairways in school buildings used for instructional purposes; provided there are at least two Exitways located a reasonably remote distance apart on each floor which accommodates more than 10 persons.
- (3) Stairways in buildings of other than Group B occupancy, having only two stories or two stories and basement or cellar; provided there are at least two Exitways located a reasonably remote distance apart on each floor which accommodates more than 10 persons; and further provided that Group A and C buildings, any basements or cellars shall be sprinklered or shall be cut off from the upper floors by enclosures at the head or foot of all basement or cellar stairs.
- (4) Stairways in buildings of other than Group B occupancy, not over four stories in height, where the stories above the second are used for storage only; provided there are at least two Exitways located a reasonably remote distance apart on each floor which accommodates more than 10 persons; and further provided that in Group A and C buildings, any basements or cellars shall be sprinklered or shall be cut off from the upper floors by enclosure at the head or foot of all basement or cellar stairs.
- (5) Stairways in sprinklered buildings.

1404-3. Required Protection for Stairways

- (a) Except as provided in Paragraphs (b) and (c) below, required enclosures for stairways shall have a fire resistance rating of not less than $\frac{3}{4}$ hour.
- (b) In any building of Fireproof or Semi-fireproof construction, or of other construction not over 4 stories high, and in any sprinklered building, required enclosures, may be constructed of $\frac{3}{4}$ -inch gypsum plaster on metal lath on each side of studs, or equivalent, or of wired glass in metal framework. Gypsum plaster means a mixture of one part of neat gypsum to not more than two parts of sand by weight for the scratch coat, and one part of neat gypsum to not more than three parts of sand by weight for the brown coat.
- (c) In any building not over 4 stories high and in any sprinklered building, existing enclosures or parts thereof constructed of plaster on wood lath or equivalent, and in good repair, may be continued in use provided they are effectively fire stopped at the basement ceiling.
- (d) An enclosure required by this Section may include both elevators and stairs, but two or more separate stairways shall not be in a single enclosure.
- (e) In lieu of a full enclosure, stairways, including moving stairways, may be protected with an enclosure at the head or at the foot of each stairway from one floor to another. Stairways so protected will not be accepted as Exit Facilities. The construction of such enclosures shall be in accord with the requirements of Paragraphs (a), (b) and (c) above.

1404-4. Door and Window Openings in Required Enclosures for Stairways

- (a) All openings in required enclosures for stairways, except window openings to the exterior of the building, shall be protected with doors in accordance with the following Paragraphs. Movable transoms in such enclosures are prohibited.
- (b) Doors in such enclosures shall be metal doors or metal covered doors or solid wooden doors of the flush type of not less than $1\frac{3}{4}$ -inch nominal thickness, except that existing doors in acceptable existing enclosures or parts thereof in any building not over 4 stories high and in any sprinklered building, may be any substantial wood doors having

any wood panels not less than ½ inch thick covered on the side opposite the stair side with sheet steel not thinner than No. 28 U.S. gauge, securely attached with bolts or screws. Any glass in doors or fixed transoms shall be wire glass.

- (c) Doors in such enclosures, except doors opening into apartments, shall be self-closing; provided that doors protecting openings in required enclosures of stairways which are frequently used for other than emergency purposes, and doors protecting openings in required enclosures of stairways in sprinklered buildings may be arranged to close automatically in case of fire.

SECTION 1405. HORIZONTAL EXITS

1405-1. Construction of Horizontal Exits

A partition dividing a story and having a fire resistance rating of not less than ¾ hour, containing no openings other than necessary doorways and properly protected duct openings, and with each doorway protected by a self-closing door at least equal in fire resistance to 1¾ inch nominal thickness flush type wooden door, shall be acceptable as a Horizontal Exit even though such partition is provided only in one story, provided an Exitway exists on each side of the partition.

SECTION 1406. EXTERIOR EXIT STAIRWAYS

1406-1. Existing Exterior Stairways

- (a) Exterior stairways heretofore constructed on buildings shall be accepted as Exit Facilities when conforming substantially to the requirements of Paragraph 1406-1(b), below, for school buildings, theaters and Group B buildings, and Paragraph 1406-1(c), below, for other buildings.
- (b) Exterior Exit Stairways hereafter constructed on school buildings, theaters and Group B buildings shall conform to the requirements of Section 407.
- (c) Exterior Exit Stairways hereafter constructed on buildings other than school buildings, theaters and Group B buildings shall conform to the following minimum requirements:
 - (1) They shall be constructed of incombustible materials, except on buildings of Frame construction or on buildings of Ordinary construction not over three stories in height.
 - (2) They shall be constructed with stairs not less than 22 inches wide between rails, having risers not higher than 9 inches and having treads not narrower than 6 inches exclusive of nosing. Ladders may be used from the upper landing to the roof.
 - (3) Unless the stair leading to the ground at the foot of the Stairway is permanently fixed, it shall be constructed with counterbalancing devices that permit it to be easily and quickly released and placed in rigid position for use.
 - (4) They shall be of sufficient strength to sustain a live load of 100 pounds per square foot or loads of 300 pounds spaced 3 feet center to center, each bearing on an area one foot wide by the depth of the tread, whichever will produce the greater stress.
 - (5) They shall be so placed that they can be readily and safely reached by the occupants of the building.

- (6) They shall be so located that safe egress will be provided at the foot either directly or through an enclosed Exitway to a street or to an open space that communicates with a street.
- (7) They shall be wide enough to ensure that the movements of those using them will not be retarded.
- (8) All balconies and stairs shall be provided with substantial guard railings at least 4 feet high, without any openings greater than 8 inches in width, except that for industrial buildings, Group E buildings and buildings not over 5 stories high, triple guard rails equally spaced, with top rail not less than 3½ feet high may be used.
- (9) Except on buildings not exceeding three stories in height and on buildings of Frame construction, all doors opening on or within 10 feet of the Exterior Exit Stairways shall be approved self-closing fire doors and any windows opening on or within 10 feet of the exterior stairway shall be approved fire windows; provided that where the occupancy inside these windows or doors is such as to present a light fire hazard or is sprinklered, or the overall exit arrangements are such that this protection is of minor importance, this requirement may be waived by the State Corporation Commission.

SECTION 1407. SLIDE TYPE FIRE ESCAPES

1407-1. General

Slide Type Fire Escapes used as Exit Facilities shall conform to Section 409.

SECTION 1408. EXIT HALLWAYS

1408-1. General

Exit Hallways connecting Exit Stairways to the outside shall be protected in the same manner as the Exit Stairways served thereby.

SECTION 1409. EXIT DOORWAYS

1409-1. Hanging of Doors

Doors in required Exitways from Places of Assembly and from stores having a sales floor area in excess of 2,500 square feet shall be hung to swing open in the direction of exit travel.

1409-2. Revolving Doors

- (a) Revolving doors shall not be used as Exit Doorways in theaters or Group B buildings nor in buildings occupied as stores where more than 75 persons are likely to be congregated, unless there are also Exit Doorways of the swinging type, having a aggregate width of at least 50 percent of required width of Exit Doorways and there is at least one swinging door adjacent to each revolving door. Revolving doors shall not be used in Exitways from school buildings.
- (b) Revolving doors shall not be used in Exitways from Places of Assembly except under one or more of the following conditions.

- (1) Where the Place of Assembly is in a building of Fireproof or Semi-fireproof construction.
- (2) Where the Place of Assembly and the remainder of the building are protected by an approved automatic sprinkler system.
- (3) Where the Place of Assembly has a capacity of not over 200 persons and has an Exit Doorway of the swinging type adjacent to each revolving door.
- (4) Where a place of refuge is provided for all occupants of the Place of Assembly in portions of the building between the Exit Doorways of the Place of Assembly and the revolving doors, and there is an Exit Doorway of the swinging type adjacent to each revolving door. Such place of refuge may consist of hallways, stairways, or areas separated from the Place of Assembly by Fire Walls or Fire Partitions.

(c) Revolving doors shall be used in Exitways only at points in the first story above grade.

1409-3. Panic Hardware

When fastening devices are installed on the Exit Doors of buildings or spaces in the classification listed below, they shall be latches (fire exit bolts) which release when pressure of not to exceed 15 pounds is applied to the releasing devices in the direction of 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.

Schools having more than 4 classrooms.

Theaters of any capacity.

Places of Assembly having a capacity in excess of 500 persons, except churches.

Places of Assembly in school buildings having a capacity in excess of 200 persons.

1409-4. Other Hardware

In buildings in which the occupants are involuntarily detained and in which the Exit Doors must be kept locked, adequate arrangements shall be made to insure prompt evacuation of the occupants in case of fire.

SECTION 1410. MAINTENANCE, MARKING AND LIGHTING

1410-1. Physical Condition

Exitways shall at all times be maintained in good, safe, usable condition, and shall at all times be kept free and clear of obstructions and shall be readily accessible.

1410-2. Exit Signs

- (a) In rooms and stories accommodating more than 100 persons, Exit Doorways shall be plainly marked by approved exit signs, sufficiently illuminated when the floor area is occupied to be readily distinguished.
- (b) Enclosed interior stairways and exterior stairways, which are provided in or for a building in addition to the required stairways and which do not conform to the provisions of this Article for required stairways, shall be marked in a suitable manner to indicate that they are not approved exits, but may be marked to indicate the extent to which they can be used as means of egress.

- (c) When the Exitways are not visible from all locations in public corridors directional signs shall be placed on walls or otherwise displayed in conspicuous locations to direct occupants thereto.

1410-3. Lighting

- (a) Required Exitways, including exterior open spaces to which they lead which give safe access to a street, shall be kept adequately lighted at all times that the building served thereby is occupied.
- (b) Electrical lighting shall be provided wherever natural lighting is inadequate.
- (c) Adequate lighting shall be provided in Places of Assembly during occupancy, except during a performance requiring dimming or darkness. During the showing of motion pictures, where it is the practice for patrons to proceed to and from seats at any time, such light intensity shall not be less than 1/20 of a foot-candle at every point thirty inches above the floor.
- (d) Required lights that are likely to be or become dangerous in any way to occupants shall be protected by suitable wire netting or other efficient means against breakage and other hazards.
- (e) In Group A buildings and Group B buildings the artificial lighting required by this Section shall be by electricity so arranged and supplied that the interruption of service on any other circuit inside the building will not result in interruption of the required lighting.

(Note: This does not necessarily require a second source of electrical energy for the building.)

1410-4. Occupancy Prohibited

No part of an Exitway shall be used for any purpose which will interfere with its value as an Exitway.

ARTICLE 15 - FIRE SAFETY FEATURES OF CONSTRUCTION

SECTION 1500. MASONRY WALLS

1500-1. General

Required masonry walls which are not otherwise regulated by this Article shall meet generally recognized minimum standards of safety. Such walls when conforming to the requirements of the current edition of any of the standards or codes listed below shall be accepted.

- (a) Building Code recommended by the National Board of Fire Underwriters.
- (b) Uniform Building Code recommended by the Pacific Coast Building Officials Conference.
- (c) Southern Standard Building Code recommended by Southern Building Code Congress.
- (d) Appropriate standards of the American Standards Association.
- (e) Any other standard or code, which the Commission may from time to time recognize.

SECTION 1501. FIRE WALLS

1501-1. Application

Fire Walls for which credit is claimed under any provision of these Regulations shall conform to the requirements of this Section.

1501-2. Construction

Fire Walls shall be of approved masonry or reinforced concrete.

1501-3. Fire Resistance

Fire Walls for any combination of occupancy and construction shall have a fire resistance rating adequate to restrict the spread of fire from one side to the other, and shall have a fire resistance rating of at least 4 hours.

(Note: See definition of "Fire Division".)

1501-4. Termination at Top

The Fire Wall shall extend at least three feet above the roof of the building which it is to protect except where the roof is of Fireproof or Semi-fireproof construction; in which case the Fire Wall shall be carried up tightly against the underside of the roof slab.

1501-5. Openings

- (a) Except in sprinklered buildings, no opening in a Fire Wall shall exceed 120 square feet in area, with no dimension greater than 12 feet, and the aggregate width of all openings at any level shall not exceed 25 percent of the length of the wall.
- (b) Every opening in a required Fire Wall shall be protected on each side of the wall with an automatic fire door, approved for such opening, except that when an opening in a Fire Wall serves as a Horizontal Exit, one of the fire doors at each such opening may

be replaced by a fire door approved for openings in Fire Partitions. Steel plate security doors may be substituted for approved Fire Doors in applications involving the protection of buildings used or occupied by persons under legal restraint.

(Note: The term "persons under legal restraint" applies only to persons who are of sound mind and are not bedridden.)

SECTION 1502. FIRE PARTITIONS

1502-1. Construction

- (a) Fire Partitions shall have a fire resistance rating of at least two hours. They shall be constructed of approved masonry or reinforced concrete, or other approved form of construction of incombustible materials.
- (b) Fire Partitions shall be supported in each story on construction having a fire resistance rating of not less than two hours; provided that when they also are load bearing the supporting construction shall have a fire resistance rating of not less than 3 hours in case the building is of Fireproof construction.
- (c) The maximum unsupported height of a Fire Partition shall not exceed thirty times its total thickness unless suitably reinforced and anchored at floor and ceiling, or unless substantially secured to vertical supports at intervals of not over thirty times the thickness.
- (d) Fire Partitions shall be deemed continuous, even though the several parts are not directly over one another in successive stories, if the intervening parts of the floors at the levels where offsets occur are unpierced and of Fireproof construction or Semi-fireproof construction and all parts not supported directly on the foundations are carried on Fireproof construction.
- (e) Chases or recesses that would reduce the thickness below the required minimum shall not be built nor cut in Fire Partitions.

1502-2. Openings

- (a) Fire Partitions shall have no openings other than required door openings, or properly protected duct openings.
- (b) Openings in required Fire Partitions shall be equipped with approved automatic-closing or self-closing fire doors. A door listed in the current edition of the Underwriters' Laboratories, Inc., "List of Inspected Fire Protection Equipment and Materials" as being approved for Class B situations shall be deemed satisfactory.

SECTION 1503. ¾-HOUR FIRE RESISTING PARTITIONS

1503-1. Construction

- (a) ¾-hour Fire Resisting Partitions shall have a fire resistance rating of at least ¾ hour. They shall be of approved form of construction.
- (b) Such partitions may be load-bearing only where the construction is approved for that purpose.
- (c) Such partitions shall be well secured.

1503-2. Openings

- (a) Required $\frac{3}{4}$ -hour Fire Resisting Partitions shall have no openings other than required door openings, or properly protected duct openings.
- (b) Openings in required $\frac{3}{4}$ -hour Fire Resisting Partitions shall be equipped with substantial metal or metal covered doors or solid wooden doors of the flush type of nominal thickness not less than $1\frac{3}{4}$ inches. Doors shall be self-closing except as provided in Paragraph 1404-4(c).

SECTION 1504. FIRE RETARDANT CEILINGS

1504-1. Construction

Fire Retardant Ceilings shall be constructed in accordance with one of the following specifications:

- (1) Not less than three-quarter inch plaster on expanded metal lath securely attached to steel supports by wire or special metal fasteners, or to wood supports by one and one-half inch, eleven gauge, seven-sixteenth inch head barbed roofing nails. Plaster to consist of one part gypsum to not over two parts sand for the scratch coat and one part gypsum to not over three parts sand for the brown coat, or to consist of portland cement and sand in the same proportions, except that three pounds of asbestos fiber shall be added with each bag of cement.
- (2) Not less than one-half inch plaster consisting of one part gypsum to not over two parts sand on a three-eighth inch perforated gypsum lath, attached to wood supports by nails not smaller than one and one-eighth inches long with three-eighth inch diameter heads, and with three-inch strips of expanded metal lath nailed over all joints in the gypsum lath with nails not smaller than one and three-quarter inches long with one-half inch heads.
- (3) Any combination floor and ceiling construction having a fire resistance rating of $\frac{3}{4}$ hour or more.

SECTION 1505. MISCELLANEOUS REQUIREMENTS

1505-1. Wood Construction Around Fireplaces, Flues and Chimneys

- (a) In buildings where alterations involve the specified items, the provisions of this Subsection shall apply.
- (b) All wooden beams and joints shall be trimmed away from flues and chimneys. Headers, beams, and joists shall be not less than two inches from the outside face of a chimney or from masonry enclosing a flue. Headers supporting trimmer arches or fireplaces shall be not less than six inches from the inside face of the nearest flue.
- (c) No woodwork shall be placed within four inches of the back face of a fireplace; nor shall combustible lathing, furring or studding be placed against a chimney; but this shall not prevent plastering directly on the masonry or on metal lath and furring.
- (d) No wooden mantel or other woodwork shall be hereafter placed within eight inches of either side nor within twelve inches of the top of a fireplace opening.

(e) All spaces between the masonry or chimneys or flues and wooden joists, beams or headers shall be firestopped by filling with incombustible materials.

(f) All spaces back of combustible mantels shall be filled with incombustible materials.

1505-2. Partitions in Multifamily Houses

In every building altered to be occupied as a multifamily house, unless sprinklered, partitions separating apartments, or apartments from public hallways, or apartments from other occupancies shall be ¾-hour Fire Resisting Partitions.

1505-3. Transoms

In buildings converted to use as sleeping quarters, transoms or similar openings shall not be installed in walls or partitions separating public hallways from apartments and sleeping rooms.

1505-4. Floors in Multifamily Houses

In every building altered to be occupied as a multifamily house, the floor construction immediately above those parts of the building occupied for business purposes shall have a fire resistance rating of not less than ¾ hour, unless such parts are sprinklered.

1505-5. Cellar Ceilings

In buildings of Ordinary construction or Frame construction, except one-story buildings, altered to change their occupancy classification, the ceilings over cellars shall conform to the requirements for Fire Retardant Ceilings.

SECTION 1506. FIRESTOPPING

1506-1. Application

In buildings where alterations involve the specified items, the provisions of this Section shall apply.

1506-2. General

Firestopping shall be provided in buildings of Ordinary and Frame construction to cut off all concealed draft openings and form effectual fire barriers. Such firestopping shall be of wood two inches in nominal thickness, or of approved incombustible materials.

1506-3. Furred Walls

When the walls are furred, the furred space shall be firestopped at floors, ceilings and roofs.

1506-4. Partitions

(a) Interior stud partitions shall be firestopped at the floors and ceilings of each story by a two-inch, nominal dimension, plate, the width of the stud, or the equivalent.

(b) When sliding doors are pocketed in partitions, such pockets shall be completely firestopped at the top, bottom and ends.

1506-5. Exterior Walls

Exterior walls of frame construction shall be properly firestopped at each floor level, at the top story ceiling level, at the roof level in the case of flat roofs, and at the foot of roof rafters in the case of sloping roofs.

1506-6. Wainscoting and Paneling

Combustible wainscoting or paneling attached to plastered walls and partitions shall be firestopped at floor and ceiling, or at top and bottom.

1506-7. Pipes, Shafting, Belts, Conveyors and Ducts

- (a) All openings around conduits, pipes or ducts shall be filled with approved incombustible material or shall be closed off by close fitting incombustible material at the ceiling and floor line or on each side of the wall.
- (b) All openings for belts, chutes and conveyors shall be provided with approved slotted doors, or be otherwise suitably protected.

SECTION 1507. PROTECTION OF OPENINGS IN EXTERIOR WALLS

1507-1. Buildings Affected

- (a) Openings in exterior walls of buildings listed below shall be protected as required by this Section:
 - (1) Buildings over 70 feet in height to the floor of the highest story, *or*
 - (2) Buildings over one story in height whose occupants are bedridden, or under legal restraint, or who, because of age or mental or physical infirmities, would ordinarily be unable to make quick exit in case of emergency, *or*
 - (3) Portions of buildings used as Places of Assembly.
- (b) Exceptions: Churches, Group E buildings and buildings of Frame and Unprotected Metal construction are exempt from the requirements of this Section.

1507-2. Openings Affected

- (a) Approved fire windows or other approved protectives shall be installed in openings in exterior walls of buildings required to be protected when:
 - (1) They are less than 30 feet in a direct line from an opening in the wall of a building of Fireproof, Semi-fireproof, Heavy Timber, Ordinary or Noncombustible construction, *or*
 - (2) They are less than 30 feet in a direct line from a building of Frame or Unprotected Metal construction, *or*
 - (3) They are less than 30 feet distant from a roof of combustible construction or from an opening in a roof of any construction.
- (b) Exceptions: Such protection is not required when:
 - (1) The opening in question and the opening against which it is to be protected are in walls in the same plane and are facing in the same direction, *or*
 - (2) The opening in question is a show window which does not extend above the first full story above grade.
- (c) For the purposes of this Section, any space within thirty feet devoted to use as a lumber yard or for the storage of comparable quantities of combustible material shall be considered as an exposing building.

1507-3. Fire Shutters

When equipped with fire shutters, at least one in every three openings facing a street in each story shall have such shutters arranged to be readily opened from the outside. Distinguishing marks shall be provided on these shutters.

1507-4. Exit Openings

When fire doors or fire shutters are used on openings to Exitways they shall be so arranged as not to obstruct such Exitways.

1507-5. Wired Glass

For the glazing of fire doors, when permitted, or of fire windows, only wired glass shall be used which shall be not less than one-quarter inch thick.

1507-6. Closing of Protectives

Non-automatic fire doors, fire shutters and fire windows on exterior openings, when not required to be open, shall be kept closed by the occupant or occupants of the building having the use or control of them.

1507-7. Installation and Approval

Fire doors, fire windows, fire shutters, window sprinklers and other protectives required by this Section shall be of approved types and installed in an approved manner. Devices enumerated in the "List of Inspected Fire Protection Equipment and Materials" issued by Underwriters' Laboratories, Inc., as revised from time to time, and listed for the purposes intended if installed in accordance with the provisions of the Standards of the National Board of Fire Underwriters as recommended by the National Fire Protection Association for the "Protection of Openings in Walls and Partitions against Fire," (N.B.F.U. Pamphlet No. 80) shall be deemed to be approved within the meaning of this Section.

SECTION 1508. PROTECTION OF SHAFTWAYS

1508-1. Application

The provisions of this Subsection shall apply to all existing shaftways used for ventilation, light, elevator, pipes, or other purposes, except stairways, moving stairways, ducts, incinerator chutes and flues and shaftways in Frame Buildings and in Group C buildings of Ordinary construction extending from the ceiling of the top story to and above the roof.

1508-2. Protection Required

All interior shaftways shall be protected in the same manner and to the same extent as prescribed in Subsection 1404–2, 3 and 4 for interior stairways; provided that doors may be automatic closing if maintaining them self-closing is impractical; and further provided that in lieu of an enclosure, floor openings for elevators, chutes, or conveyors in factories and industrial occupancies may be protected by substantial guards or gates with approved draft-tight trap doors at each floor opening. Such trap doors shall be constructed to form a substantial floor surface when closed, and those for elevators shall be arranged to open and close by action of the elevator in ascending or descending. The trap doors shall be kept closed when the shaftway is not in use.

(Note: Hoist-way doors may be considered self-closing when the elevator cab cannot be moved from the opening in question unless the doors are closed.)

ARTICLE 16 - FIRE PROTECTION EQUIPMENT

SECTION 1600. GENERAL

1600-1. Design and Installation

All fire extinguishing equipment required by these Regulations, or for which credit is claimed under some provision of these Regulations, shall be designed and installed in accordance with good engineering practice. Compliance with the appropriate portions of the following Standards of the National Board of Fire Underwriters shall be deemed prima facie evidence of compliance with this Article, in so far as they apply. Applicable Standards of the National Board of Fire Underwriters, as recommended by the National Fire Protection Association, include:

“Sprinkler Equipment” (N.B.F.U. Pamphlet No. 13)

“Fire Department Hose Connections for Sprinkler and Standpipe Systems” (N.B.F.U. Pamphlet No. 23)

“Standpipe and Hose Systems” (N.B.F.U Pamphlet No. 14)

“Proprietary, Auxiliary and Local Systems for Watchman, Fire Alarm and Supervisory Service” (N.B.F.U. Pamphlet No. 72)

1600-2. Materials

Materials, appliances, fittings and devices hereafter installed in fire extinguishing equipment required by this Article shall be of approved type and quality. Such materials, appliances, fittings and devices when currently approved by the Underwriters’ Laboratories, Inc., and listed for the purposes intended shall be accepted as conforming to the requirements of this Section.

SECTION 1601. SPRINKLER AND FIRE DETECTION EQUIPMENT

1601-1. When Required

Where a building or structure, due to its construction, occupancy, or other factors and due to the lack of an automatic sprinkler system or other approved automatic detection and extinguishing devices presents a condition excessively hazardous to life from fire, such building or structure shall be equipped with an approved automatic sprinkler system or other approved automatic detection and extinguishing device on written order of the State Corporation Commission.

1601-2. Water Supplies

Required sprinkler systems shall have at least one approved automatic water supply of adequate pressure, capacity and reliability.

ARTICLE 17 - ADDITIONAL PROVISIONS FOR SPECIAL OCCUPANCIES

SECTION 1700. GENERAL

1700-1. Purpose

The intent of this Article is to require supplemental or modified safeguards for life from fire in buildings which due to occupancy, present hazards not fully regulated by the preceding Articles. The requirements of Articles 11, 12, 13, 14, 15 and 16 shall apply to all buildings regulated by this Article except as modified by the provisions of this Article.

SECTION 1701. PLACES OF ASSEMBLY

1701-1. Application

Existing Places of Assembly in buildings shall conform to the requirements of this Section. No new Place of Assembly shall be established in a building unless it conforms to Section 701 and Section 702.

(Note: See Section 703 for Outdoor Places of Assembly.)

1701-2. Seating Arrangements

- (a) Except in gymnasiums, restaurants, night clubs, churches and other places of religious assembly, individual seats shall be provided for the persons seated therein.
- (b) The width of seat allotted for each person shall be not less than 18 inches.
- (c) Seats in rows, whether fixed or movable, shall, except in boxes or loges not exceeding 60 square feet in area, be not less than 30 inches apart from back to back measured in a horizontal direction.
- (d) When individual fixed seats are provided or required, the maximum number of seats in a row extending from one aisle to another shall be 16 and the maximum number of seats in a row extending from one aisle to a wall shall be 8, except that if the seatings are fixed chairs with self-rising seats so spaced that when the seats are raised there is an unobstructed space of not less than 18 inches horizontal projection between the rows of seats, and doorways leading directly to exit corridors are provided not more than 5 feet apart along the sides of the auditorium, the number of seats in a row shall not be limited.
- (e) In Places of Assembly used regularly for theatrical, operatic or similar performances, or for the display of motion pictures, the seats, except in boxes or loges not exceeding 60 square feet in area, shall be fixed and shall be separated by arms.
- (f) In boxes or loges not exceeding 60 square feet in area, and in other locations where loose chairs are permitted, not more than one chair shall be provided for each 6 square feet of floor space occupied.

1701-3. Aisles

- (a) Every aisle shall lead to an exit door, or to a cross aisle; that is, an aisle running parallel with the seat rows and leading to an exit door.

- (b) No point of a cross aisle shall have a clear width of less than 33 inches.
- (c) No point of a longitudinal aisle shall have a clear width of less than 30 inches, except that the clear width may be 28 inches when there are seats on only one side of the aisle.
- (d) A longitudinal aisle accommodating more than 220 persons and leading to exits or cross aisles in one direction only, shall be widened uniformly in the direction of normal exit travel. The widest portion of the aisle shall not be less than as computed by the formula:

$$W = \frac{22 P}{160}$$

where W equals the required width in inches and P equals the total number of persons to be accommodated by the aisle.

- (e) A longitudinal aisle accommodating more than 220 persons, and leading to exits or cross aisles in both directions shall conform to (d) above, or shall be of constant width. When of constant width, the width shall be not less than as computed by the formula:

$$W = 15 + \frac{11 P}{160}$$

where W equals the required width in inches and P equals the total number of persons to be accommodated by the aisle.

- (f) There shall be no steps in any main floor aisle, except at the rear of the main floor in a stadium type theater. Steps in other aisles shall be the full width of the aisles. Stepped aisles shall not be construed as being stairways.

1701-4. Galleries and Balconies

In galleries, balconies or other locations where seatings are arranged on platforms or successive tiers, and the height of the riser from one platform to another below and in front of it exceeds 21 inches, a substantial railing not less than 26 inches high shall be placed at the edge of the platform along the entire row of seats.

1701-5. Stage

- (a) *General.* No stage for theatrical or similar performances, including drama, opera, vaudeville and the like, which requires or uses a curtain, portable or fixed scenery, light, mechanical appliances, or any of them shall be placed in a building except in conformity with the appropriate provisions of this Subsection.
- (b) *Enclosure Walls.* The stage shall be separated from all other parts of the building by masonry walls having a fire resistance rating of not less than 2 hours and with openings protected as required in Paragraph (c) and (d) below; except that in motion picture theaters, school auditoriums, clubs and similar Places of Assembly where the stage or platform is without provisions for the vertical shifting of scenery, separation between the stage and the auditorium shall not be required. Required separating walls shall extend from the foundation to at least 4 feet above the roof, except where the roof is of Fireproof or Semi-fireproof construction, in which case the walls shall be carried up tightly against the underside of the roof slab.

- (c) *Proscenium Wall Openings.* Each opening other than the proscenium opening in the Wall which separates the stage from the auditorium shall be protected by an approved self-closing fire door of a type approved for use in Fire Partitions as provided in Subsection 1602–2.

(Note: The use of a door listed in the current List of Fire Protection Equipment, Underwriters' Laboratories, Inc. as satisfactory for protection of openings in Class B situations, properly installed, will be acceptable.)

- (d) *Curtain.* The proscenium opening in the required separating partition between stage and auditorium shall be provided with an approved curtain for the protection of the opening in case of fire on the stage. When the proscenium opening is less than 60 feet in width, a curtain conforming to Chapter 41 of the 1949 Edition of the Uniform Building Code adopted by the Pacific Coast Building Officials Conference shall be deemed approved. For proscenium openings 60 feet in width or more, a curtain conforming to the requirements of Section 1201 of the 1949 Edition of the National Building Code recommended by the National Board of Fire Underwriters shall be deemed approved. Curtain not conforming to the above standards shall be submitted to the State Corporation Commission for approval prior to installation.

(Note: See Appendix C for Uniform Building Code curtain requirements. See Appendix D for National Building Code curtain requirements.)

- (e) *Location of Electrical Switchboard.* The switchboard for the electrical equipment of the stage shall be so located that it will be accessible at all times, and will be protected from falling objects and from the storage or placing of stage equipment against it.

1701-6. Extinguishing Equipment

- (a) Stages required to be separated from the auditorium shall be sprinklered under the roof of the stage, under the gridiron, the rigging loft and fly and tie galleries, under the stage, in dressing rooms, scene docks, workshops and storage rooms.
- (b) On stages required to be separated from the auditorium one approved 2½-inch standpipe outlet shall be provided on each side of the stage. Each outlet shall be equipped with approved 1½-inch hose and nozzle, the quantity of hose being sufficient to allow a stream to reach any portion of the stage section and in no case less than fifty feet.
- (c) One approved hand fire extinguisher suitable for extinguishing fires in ordinary materials shall be located on the stage at each side of the proscenium opening; a similar device shall be located accessible to but outside the projection booth.

1701-7. Places of Assembly Combined with Other Occupancies

No Places of Assembly having a stage as described in Paragraph 1701–5(a), above, or which is used for the projection of motion pictures from nitrocellulose film, shall be continued in use within or attached to a building of other than Group A occupancy unless:

- (1) It is separated from such occupancy by wall, ceiling and floor construction having a fire resistance rating of not less than two hours, *or*
- (2) Such other occupancy is equipped with an approved automatic sprinkler system.

1701-8. Flameproofing Requirements

- (a) Use of combustible material for decorative purposes shall be kept to a minimum in Places of Assembly, and all such material, including curtains, draperies, artificial trees

or other decorative material, but not including floors, walls and ceilings, rendered flameproof. Such flameproofing shall be tested at intervals of not more than 6 months, and shall be renewed when found necessary.

- (b) On stage requiring separation from the auditorium all scenery, drapes and sets used on the stage shall be coated or treated to render them flameproof.

SECTION 1702. MOTION PICTURE PROJECTION

1702-1. Application

In any building where motion pictures are projected from nitrocellulose film, the projection equipment and the storage and handling of such film shall conform to the requirements of this Section.

1702-2. Projection Booths and Equipment

- (a) Motion picture projectors using nitrocellulose film shall be operated or set up for operation only within an approved enclosure, not less than 8 feet wide, 10 feet deep and 8 feet high for one projection machine, and not less than 14 feet wide, 10 feet deep and 8 feet high for 2 machines.
- (b) The walls and ceilings of the enclosure shall be of a form of construction having a fire resistance rating of not less than one hour. Only incombustible materials shall be used in the construction of the enclosure walls. All joints shall be sufficiently tight to prevent the discharge of smoke.
- (c) The enclosure shall have at least two exit doors, each not less than 30 inches wide and 6 feet high, protected by approved self-closing fire doors.
- (d) Two openings for each motion picture projector shall be provided; one for the projectionist's view (observation port) shall be not larger than 200 square inches, and the other through which the picture is projected (projection port) shall be not larger than 120 square inches. Where separate stereopticon, spot or flood light machines are installed in the same enclosure with picture machines, not more than one opening for each such machine shall be provided for both the operator's view and for the projection of the light, but two or more machines may be operated through the same opening; such openings shall be as small as practicable and shall be capable of being protected by approved automatic shutters.
- (e) Each opening shall be provided with an approved gravity shutter set into guides not less than one inch at sides and bottom, and overlapping the top of the opening by not less than one inch when closed. Shutters shall be of not less than 10-gauge iron or its equivalent, or of ¼-inch hard asbestos board. Guides shall be of not less than 10-gauge iron or its equivalent. Each shutter shall have a fusible link above it, and there shall also be one located over each upper projector magazine which, upon operating, will close all the shutters. There shall also be provided suitable means for manually closing all shutters simultaneously from a point within the projection room near each exit door. Shutters on openings not in use shall be kept closed.
- (f) All shelves, furniture and fixtures within the enclosure shall be constructed of incombustible material.
- (g) Projection machines shall be adequately supported and secured against overturning.
- (h) Existing enclosures for motion picture projectors may be continued in use if of a general construction such that the gases of combustion will not be liberated into the

seating area; in which case the above requirements respecting size of enclosure and size and number of door openings thereto may be disregarded.

1702-3. Ventilation

- (a) Ventilation shall be provided by one or more mechanical exhaust systems which shall draw air from each arc lamp housing and from one or more points near the ceiling. Systems shall exhaust to the outdoors either directly or through an incombustible flue used for no other purpose. Exhaust capacity shall be not less than 15 cubic feet nor more than 50 cubic feet per minute for each arc lamp plus 200 cubic feet per minute for the room itself. Systems shall be controlled from within the enclosure and have pilot lights to indicate operation. The exhaust system serving the projection room may be extended to cover rooms associated therewith, such as rewind rooms, but ventilation of these rooms shall not be connected in any way with ventilation or air conditioning systems serving other portions of the building.
- (b) Exhaust ducts shall be of incombustible material and shall either be kept one inch from combustible material or covered with ½ inch of incombustible heat insulating material.
- (c) Fresh air intakes other than those direct to the open air shall be protected by approved fire shutters arranged to operate automatically with the port shutters.

SECTION 1703. GARAGES

1703-1. Application

The provisions of this Section apply to buildings occupied as garages.

1703-2. Garages Combined with Other Occupancies

- (a) Except as permitted in paragraph (b) below, and for fire stations, no garage shall be located in or attached to a Group A, Group B, Group C, or Group D building of other than industrial occupancy unless:
 - (1) The garage is separated from such other occupancies by Fire Partitions and by floors and ceilings of Fireproof or Semi-fireproof construction, *or*
 - (2) The garage area is equipped with an approved automatic sprinkler system.
- (b) A garage not exceeding 3,000 square feet in area and used only for storage of passenger automobiles or trucks of one ton or less capacity may be located in or attached to a Group A, Group B, Group C, or Group D building of other than industrial occupancy when:
 - (1) The garage area is separated from such occupancy by wall, floor and ceiling construction of at least ¾-hour fire resistance with all connecting openings protected by approved self-closing fire doors as specified for ¾-hour Fire Resisting Partitions, *or*
 - (2) The garage area is equipped with an approved automatic sprinkler system.

1703-3. Ventilation

All garages having one or more floors below grade shall have such stories continuously ventilated by a mechanical ventilating system with positive means for both the inlet and exhaust of at least one cubic foot of air per minute per square foot of floor area. Controls for the exhaust and inlet fans shall be close to the entrance door. The

ventilating equipment may be combined with the heating system, providing that no air shall be recirculated.

1703-4. Miscellaneous

Ramps connecting floors of garages need not be enclosed and protected in the various stories if the garage is protected with automatic sprinklers or if ramps are around an open air shaft extending through the roof, or if fifty percent of the wall area of two sides of the garage is open to the air at each story above the first floor, or above the basement floor if a basement floor is provided. Suitable egress provisions shall be provided for persons from each floor.

1981 Edition; The following Part Three was added.

PART THREE

***Buildings Subject to the Virginia Uniform Statewide
Building Code
Beginning September 1, 1973***

ARTICLE 21 - ADMINISTRATION

SECTION 2100. SCOPE

2100-1. Short Title:

These regulations shall be known and may be cited as the Virginia Public Building Safety Regulations. Except as otherwise indicated herein, Regulations shall mean the Virginia Public Building Safety Regulations, Law shall mean the Virginia Public Building Safety Law (Article 2, Chapter 6, Title 27 of the Code of Virginia) and the Board shall mean Board of Housing and Community Development.

2100-2. Application:

Articles 21 and 22 (PART THREE) of these regulations shall apply to all public buildings that were erected, and to the equipment that was installed therein, on or after the effective date of the Uniform Statewide Building Code. Public building means and includes any building or structure, permanent or temporary, which is used or occupied, or to be used or occupied by ten or more persons who are employed, lodged, housed, assembled, served, entertained, or instructed therein and, without limiting the foregoing, includes hotels, schools, and colleges, hospitals of all kinds, asylums, mercantile establishments, office buildings, apartment houses, theatres, restaurants, auditoriums, stadiums, gymnasiums, armories, dance halls, factories, work shops, lodges, meeting rooms, manufacturing and processing of establishments, and all other buildings and structures of same or similar character or of same or similar use; including buildings owned and occupied by the State or by any of its political subdivisions. Public buildings shall also mean all homes for adults licensed pursuant to Chapter 9 (§ 63.1-172 et. Seq.) of Title 36.1 of the Code of Virginia and all residential care facilities operated by any State Agency.

2100-3. Effective Date:

The effective date of Part Three of these regulations shall be July 15, 1982.

SECTION 2101. ENFORCEMENT

2101-1. General:

These regulations shall be enforced as prescribed by Article 2, chapter 6, Title 27 of the Code of Virginia.

2101-2. Chief Fire Marshal:

Subject to the supervision and direction of the Director of the Department of Housing and Community Development, the Chief Fire Marshal shall be directly responsible to the proper exercise of the functions of the Office of State Fire Marshal in connection with enforcement of Article 2, Chapter 6, Title 27 Code of Virginia and of these Regulations.

ARTICLE 22 - REQUIREMENTS

SECTION 2200. REFERENCE CODE

2200-1. Application of Uniform Statewide Building Code:

Public buildings erected under the Uniform Statewide Building Code shall be maintained in compliance with the fire safety provisions of the Uniform Statewide Building Code. When an occupancy permit has been issued under the provisions of the Uniform Statewide Building Code maintenance of compliance shall be in accordance with the conditions of the occupancy permit as approved by the building official.

maintenance of compliance

APPENDIXES

APPENDIX A

VIRGINIA FIRE HAZARDS LAW

(Extracted from Title 27, Chapter 6, Article 2, Code of Virginia)

ARTICLE 2. FIRE HAZARDS LAW

Section 27-63. Short Title – The short title of the law embraced in this article is the Virginia Fire Hazards Law.

Section 27-64. Definitions Generally. – As used in this article, unless a different meaning or construction is clearly required by the context:

- (1) "The law," or "this law" means the Virginia Fire Hazards Law as now or hereafter embraced in this article;
- (2) "Commission" means the State Corporation Commission;
- (3) "Chief Fire Marshal" means the State fire marshal provided for by this law;
- (4) "Minimum standards" means the least requirements imposed by or in pursuance of this law upon any person, political subdivision, or State agency relative to the hazards to life or property in connection with fire;
- (5) "Building" means a "public building" as defined by and embraced within the purview of the provisions of this law and shall include additions and alterations thereto.

Section 27-65. Definitions of "public building". – As used in this article, unless a different meaning or construction is clearly required by the context, the term "public building" means and includes any building or structure, permanent or temporary, which is used or occupied or to be used or occupied, by ten or more persons who are employed, lodged, housed, assembled, served, entertained or instructed therein, and without limiting the foregoing, includes hotels, schools and colleges, hospitals of all kinds, asylums, mercantile establishments, office buildings, apartment houses, theaters, restaurants, auditoriums, stadiums, gymnasiums, armories, dance halls, factories, work shops, lodges, meeting rooms, manufacturing and processing establishments, and all other buildings and structures of same or similar character or of same or similar use; including buildings owned and occupied by the State or by any of its political subdivisions.

Provided, however, that in any city having a population according to the last official census of more than 200,000 people, no building or structure as aforesaid shall be included in the term "public building" as aforesaid, unless such building or structure as aforesaid is so used or occupied by 20 or more persons as aforesaid.

Section 27-66. Office of Chief Fire Marshal created. – The office of Chief Fire Marshal is hereby created within the Bureau of Insurance under the Commission.

Section 27-67. Appointment, powers and duties of Chief Fire Marshal. – The Commission shall appoint a Chief Fire Marshal whose powers and duties shall be such as are prescribed by this law and by rules and regulations adopted by the Commission. The Commission may by general rule or specific action delegate to the Chief Fire Marshal any of its duties and functions relative to the enforcement of this law or regulations adopted by the Commission.

Section 27-68. *Salary and expenses of Chief Fire Marshal.* – The Chief Fire Marshal shall receive such annual salary as is provided by the Commission in addition to actual expenses.

Section 27-69. *Qualifications of Chief Fire Marshal.* – The Chief Fire Marshal shall be selected upon the basis of education or experience tending to qualify one for the performance of the work of administering laws and rules and regulations having as their object the prevention and elimination of hazards to life and property arising from fire.

Section 27-70. *Appointment and powers of deputy fire marshals.* – The Commission is authorized to appoint deputy State fire marshals, who shall, in addition to the powers now conferred by law, exercise the same powers and perform the same duties as city and town fire marshals, as provided in Sections 27-31 to 27-35, and shall have the same police powers as a sheriff in the investigation and prosecution of all cases of alleged arson and of other cases of fires alleged to involve criminality.

Section 27-71. *Employees and offices.* – The Commission may employ such technical, clerical and other assistants as is found necessary or advisable and fix their compensation, and may likewise purchase equipment and supplies deemed necessary for the proper administration and enforcement of this law. Suitable quarters shall be assigned by the Director of the Division of the Budget in accordance with directions of the Governor.

Section 27-72. *Rules and regulations; minimum standards.* – The Commission shall from time to time adopt, promulgate and publish rules and regulations prescribing minimum standards to be complied with in all public buildings for the protection of life and property from the hazards incident to fire. The Commission may employ any persons specifically qualified for the purpose of rendering assistance in the adoption of rules and regulations. All such rules and regulations shall be reasonable and appropriate to the objectives thereof and of this law and within the guiding principles prescribed by the General Assembly in this law and in any other law in pari materia. In making such rules and regulations the Commission shall have due regard to the standards of safety from hazards of fire as recognized by established practices. The Commission shall have due regard to the laws and practices in other states, as well as localities in this State. All such rules and regulations shall have as their objective the affording of a maximum of protection and safety to the public as to life and property in public buildings as to the hazards of fire with a minimum of interference with and burden upon those operating or owning such buildings.

Section 27-73. *Public hearing for adoption of rules or regulations; notice required.* – Before any rules or regulations are adopted the Commission shall hold at least one public hearing. At least thirty days' notice thereof shall be given by publication in at least four newspapers of general circulation published in the State. In addition to notice by publication the Commission shall notify in writing the mayor or other like official of every municipality in the State, and the chairman of the governing body of every county in the State of such hearing, but failure to give or receive any such notice shall not in anywise impair the validity of any rule or regulation adopted, amended, or repealed. At any such hearing all persons desiring to do so shall be afforded an opportunity to present their views. Notice of amendments to or repeal of any rules or regulations theretofore adopted shall be given as aforesaid.

Section 27-74. *Amendment, etc., of rules and regulations.* – The Commission may modify, amend, or repeal any rule or regulation from time to time, as the public interest requires, after notice and hearing as provided in section 27-73.

Section 27-75. *Printing and distribution of rules and regulations in pamphlet form.* – The Commission shall have printed from time to time and keep available in pamphlet form all rules and regulations for the protection of life and property from fires in public buildings. Such pamphlets shall be furnished upon request to members of the public.

Section 27-76. *When rules and regulations become effective.* – As to buildings constructed thereafter, no rule or regulation shall be made effective earlier than thirty days from the date of adoption of such rule; as to any building existing at the time of adoption of any rule or regulation hereunder a period of one year shall be allowed for compliance therewith. In any case of extreme hazard to life the Commission may make any rule applicable thereto immediately effective and may give the owner thereof a reasonable time to comply therewith.

Section 27-77. *Copy of rules and regulations to be kept accessible to the public.* – A true copy of all rules and regulations adopted and in force shall be kept in the office of the Chief Fire Marshal and in the office of the Commission, accessible to the public.

Section 27-78. *Fire protection in localities.* – Nothing in this law or in any rule or regulation made in pursuance thereof shall impair in any way the powers and authority heretofore or hereafter conferred on any political subdivision of the State, or any ordinance or code heretofore or hereafter validly adopted by any such subdivision, provided that all such ordinances and codes, rules, regulations and practices of any such subdivision measure up to the minimum standards fixed by this law or by the Commission.

Section 27-79. *Inspection in localities.* – Notwithstanding the continuance of the powers and duties of local authorities as to fire hazards, the Commission, the Chief Fire Marshal and his deputies are empowered to and shall make such inspections, upon request of local authorities, upon complaint, or of their own initiative, as reasonably calculated to enable it to be determined whether the general law or any applicable rule or regulation of the Commission is being violated or is about to be violated.

Section 27-80. *Injunction upon application of Commission or Chief Fire Marshal.* – Every court having general equity jurisdiction under existing or any future law is empowered to and shall, upon the application of the Commission or upon application of the Chief Fire Marshal, issue either a mandatory or restraining injunction in aid of the enforcement of, or in prevention of the violation of, any of the provisions of this law or of any valid rule or regulation made in pursuance thereof. The procedure for obtaining any such injunction shall be in accordance with the laws then current governing injunctions generally except that the Commission or Chief Fire Marshal shall not be required to give bond as a condition precedent to obtaining an injunction.

Section 27-81. *Certification of facts to Attorney General; duties as to injunction; Commonwealth's attorney.* – Before an application for an injunction may be made under the provisions of this law, except in case of emergency, the Commission or the Chief Fire Marshal shall certify the relevant facts to the Attorney General, who shall represent the Commission or the Chief Fire Marshal in the institution and prosecution of the proceedings, provided that the Attorney General may require the Commonwealth's attorney, in the particular county or city where the proceeding is to be instituted, to institute and conduct the same or to assist therein.

Section 27-82. Duties of law enforcement officers. – Every Commonwealth’s attorney shall co-operate with the Attorney General as and when required under the provisions of this law and shall prosecute all violations of this law, or of rules and regulations prescribed thereunder, in the same manner and to the same extent as in cases of violations of other laws of the State. All State and local police and other law enforcement officials are authorized to and shall enforce the provisions of this law, and the rules and regulations made in pursuance thereof, in the same manner and to the same extent that they are required to and do enforce other State laws enacted in pursuance of the police power, and by which penalties and punishment are imposed for violations.

Section 27-83. Who shall prosecute violations; notice to Governor; jurisdiction; appeals. – The Commission, Chief Fire Marshal, or any of their agents or employees, and any other officer authorized to enforce this law or any rule or regulation issued hereunder, when informed of any violation thereof, shall prosecute the person responsible therefore as in the case of other misdemeanors. The Chief Fire Marshal shall notify the Governor in writing in case of any violation of this law, or rule and regulation issued thereunder, involving any building owned directly or indirectly or occupied by the State or by any political subdivision thereof, and shall at the same time notify the official in charge of such building of such violation. Any trial justice having jurisdiction to try misdemeanors and any court of record having criminal jurisdiction is empowered to try persons for such violations. Appeals from the judgment of any trial justice or from any such court of record shall be governed by general laws. Appeals from the judgment of any court of record to the Supreme Court of Appeals shall be likewise so governed.

Section 27-84. Penalties for violations. - The violation of or failure to comply with any requirements of this law or of any rule or regulation adopted and promulgated in pursuance thereof shall constitute a misdemeanor. Upon conviction the person found guilty shall be punished by confinement in jail not more than twelve months or fined not more than five hundred dollars, either or both. Each day of any such violation or failure to comply shall constitute a separate offense. If the same act or failure to act constitutes a violation of this law or such rules and regulations or orders or directions made or issued in pursuance thereof, and also a punishable violation of an ordinance or code provision of any political subdivision of the State, a conviction under any such local ordinance or code or under this law shall not bar a prosecution and conviction under this law or under local ordinance or code, as the case may be, anything in Section 19-232 or any other statute to the contrary notwithstanding.

Section 27-85. Transfer of powers and duties of other State agencies. – The powers, duties and responsibilities of the State Board of Health, the Department of Labor and Industry and the State Board of Education in all matters pertaining to the protection of life and property from fires in public buildings, are hereby transferred to and imposed upon to the State Corporation Commission which shall exercise the same as herein authorized.

APPENDIX B

FIRE RESISTANCE RATINGS

The following tables present for the information of users of these Regulations, data on fire resistance ratings of walls and partitions, column protections, beam, girder and truss protections, and floor and roof constructions. No claims are made as to the completeness of these tables since they are included for information only.

FIRE WALLS AND EXTERIOR WALLS

Fire resistance ratings as determined by the standard fire test do not provide an adequate basis for specifying minimum thicknesses of fire walls and exterior walls of buildings. The standard fire test is made on a sample wall about 10 feet square and to be rated as a 4-hour wall, for example, the sample must stand up under the standard exposure fire and bear its rated load, if of load bearing construction, for a period of 4 hours without attaining a temperature on its unexposed face higher than 250°F. above the starting temperature. The hose stream test which is also specified is made on a like sample exposed to only 1-hour fire so that this test is not a critical factor in such walls.

It is obvious that a fire test as described will not measure the ability of a wall many times the size of the test panel to stand up against fire exposure extending over more or less its entire area. Walls expand when heated and in severe building fires it is common to see them curl and fall as the result of such expansion on the heated side. Ability to withstand the impact from collapsing floors and falling objects is also important.

When a wall is called upon to stop a spreading fire that is reaching or has attained conflagration proportions it must have stability against collapse or overturning far in excess of that presented by certain types of construction which develop a 4-hour resistance in the standard fire test, if it is to serve its purpose.

MATERIALS AND FORMS OF CONSTRUCTION

The thicknesses of walls, partitions and floor slabs specified in the tables are based on fire resistance only and are not to be construed as permitting such thicknesses where other considerations require greater thicknesses.

PLASTER

Plaster mixes are designated as follows: "1:2, 1:3 gypsum and sand plaster" indicates two coats of plaster, the first or scratch coat made of 1 part gypsum to 2 parts sand, and the second or brown coat of 1 part gypsum to 3 parts sand.

Plaster proportions are by weight unless otherwise indicated.

Plaster of proportions richer in cement or gypsum content than specified for a given rating may be used unless otherwise indicated.

Thickness of plaster is measured from the face of the plaster base, except that WITH metal lathe it is measured from the back of the lath unless otherwise stated. The usual 1/8-inch white or finish coat of plaster may be included in the required plaster thickness.

CONCRETE

Ratings involving concrete are based on concrete consisting of one part Portland cement to not more than 6 parts fine and coarse aggregate combined, measured by volume, dry.

EXPLANATORY NOTES AND REFERENCES

Figures and letters appearing in the tables refer to explanatory notes given at the end of the tables.

The abbreviation "Comb." Appearing in the tables under Rating means the assembly is rated as combustible. According to the Standard Fire Test an assembly is rated as combustible when it involves combustibles in such kind or quantity or so contained as to burn freely during the exposure to the fire test, or continue flaming or ignite after the furnace fire is shut off.

FIRE RESISTANCE RATINGS OF WALLS AND PARTITIONS

Ratings Based on Standard Fire Tests

Type	Details of Construction	Combustible Members Framed in Wall ¹				Members Framed in Wall: None or Noncombustible			
		Minimum Thickness ² , Inches for Rating of				Minimum Thickness ² , Inches for Ratings of			
		4 hrs.	3 hrs.	2 hrs.	1 hr.	4 hrs.	3 hrs.	2 hrs.	1 hr.
Brick (clay, shale, concrete or sand-lime)	Solid walls plastered one side or unplastered _ _ _ _ _	12	12	8	8	8	8	8	4*
	Solid walls plastered each side with 1/2 in. 1:3 gypsum and sand or Portland cement and sand plaster _ _ _ _ _	12	12	8	8	8	8	4*	4*
	Hollow "Cavity" type walls; 1/4 in. round metal ties spaced 2 ft. horizontally every 6 th course (I) _ _ _ _ _	---	---	---	9	9	9	9	9
Concrete Masonry Units	Units listed ³ by Underwriters' Laboratories, Inc. as Class D-2 fire retardants _ _ _ _ _	---	---	---	8	---	---	8	8
	Same plastered each side with 3/4 in. Portland cement stucco or Portland cement or gypsum plaster _ _ _ _ _	---	---	---	8	---	8	8	8
	Units listed ³ by U.L., Inc. as Class C-3 fire retardants	---	---	---	8	---	8	8	8
	Same plastered as above _ _ _ _ _	---	---	---	8	8	8	8	8
	Units listed ³ by U.L., Inc. as Class B-4 fire retardants	---	---	---	8	8	8	8	8
Hollow Tile⁷ (clay or shale) Load Bearing	Unplastered (D) _ _ _ _ _	U = units		C = cells		See Note 7			
	Plastered one side ⁹ with 7/8 in. 1:3 gypsum and sand plaster (D) _ _ _ _ _	16 _{4C} ^{2U}	16 _{4C} ^{2U}	12 _{3C}	12 _{3C} ⁸	12 _{4C} ^{2U}	12 _{3C} ^{2U}	12 _{3C}	8 _{2C}
	Plastered each side as above (D) _ _ _ _ _	16 _{4C} ^{2U}	12 _{3C}	12 _{2C} ⁸	8 _{2C} ^{2U}	12 _{3C} ^{2U}	12 _{3C}	8 _{3C}	8 _{2C}
	16 _{4C} ^{2U}	12 _{3C}	12 _{2C} ⁸	8 _{2C}	12 _{3C}	8 _{2C}	8 _{2C}	8 _{2C}	

*Nonbearing

Number superscripts refer to notes, pages 120-122

FIRE RESISTANCE RATINGS OF WALLS AND PARTITIONS –Continued

Ratings based on Standard Fire Tests

Type	Details of Construction	Combustible Members Framed in Wall ¹				Members Framed in Wall: None or Noncombustible			
		Minimum Thickness ² , Inches for Ratings of				Minimum Thickness ² , Inches for Rating of			
		4 hrs.	3 hrs.	2hrs.	1hr.	4 hrs.	3 hrs.	2 hrs.	1hr.
Hollow Tile, Brick-faced	Hollow clay (or shale) load-bearing tile of thickness shown , bonded to 4 in. brick facing, unplastered (I) _ _ _ _ _	---	---	8	4	8	4	4	4
	Same as above with tile side plastered with 5/8 in. 1:3 gypsum and sand plaster (D, I) _ _ _ _ _	---	12	8	4	4	4	4	4

FIRE RESISTANCE RATINGS OF WALLS AND PARTITIONS – Continued

Estimated Ratings

Type	Details of Construction	Members Framed in Wall: None or Noncombustible ⁶			
		Minimum Equivalent Thickness ⁵ , for Ratings of			
		4 hrs.	3 hrs.	2 hrs.	1 hr.
Hollow Concrete Masonry Units	Coarse aggregate, expanded slag, or pumice (QQ) _____	4.7	4.0	3.2	2.1
	Coarse aggregate, expanded clay (QQ) _____	5.7	4.8	3.8	2.6
	Course aggregate, limestone, cinders or unexpanded slag (QQ) __	5.9	5.0	4.0	2.7
	Course aggregate, calcareous gravel (QQ) _____	6.2	5.3	4.2	2.8
	Course aggregate, siliceous gravel (QQ) _____	6.7	5.7	4.5	3.0
Type	Details of Construction	Minimum Thickness ² , Inches for Ratings of			
		4 hrs.	3 hrs.	2 hrs.	1 hr.
Plain Concrete	Solid walls (K, GG) _____	7 ½	6 ½	5 ½	4
Reinforced Concrete	Solid walls, unplastered: Group 1 Aggregates ¹¹ , ¾ in. maximum size (K) _____	6 ½	6	5	3 ½
	Group 2 Aggregates ¹¹ , ¾ in. maximum size (K, GG) _____	7 ½	6 ½	5 ½	4
	Solid walls plastered each side with ¾ in. Portland cement stucco or Portland cement or gypsum plaster: Group 1 Aggregate ¹¹ , ¾ in. maximum size (K) _____	5	4	3*	3*
	Group 2 Aggregate ¹¹ , ¾ in. maximum size (K) _____	6	5	4	3*
Stone Masonry	Solid walls _____	12	12	12	8

*Nonbearing.

See note 5 for definition of equivalent thickness

FIRE RESISTANCE RATINGS OF WALLS AND PARTITIONS - Continued

Ratings Based on Standard Fire Tests

Type	Details of Construction	Rating
Clay Tile Partitions	6 in. partition with two units in wall thickness, one unit 4 in., other 1¾ in. thick, with ¾ in. joint between filled with mortar. Position of units reversed on alternating courses. Tile cored not to exceed 25% in 4 in. unit, and not exceed 15% in 1¾ in. unit (N) _____	3 hrs*
	6 in. partition consisting of 4 in. tile cored not to exceed 41%, faced on fire exposed side with 1 ¾ in. tile cored not to exceed 15% with 3/8 in. mortar filled joint between, and plastered on opposite side with ¾ in. 1:3 gypsum and sand plaster (L) _____	3 hrs*
	4 in. facing tile cored not to exceed 25%, plastered on back side with ¾ in. 1:3 gypsum and sand plaster (N) _____	2 hrs*
	4 in. facing tile cored not to exceed 30%, plastered on back side with ¾ in. gypsum-vermiculite plaster composed of 3 ½ cu. ft. vermiculite to 100 lbs. Gypsum (P) _____	2 hrs*
	4 in. facing tile cored not to exceed 47%, plastered on back side with ¾ in. 1:3 gypsum and sand plaster (DD) _____	1 hr*
	4 in. hollow tile plastered each side with ¾ in. 1:3 gypsum and sand plaster (E) _____	1 hr*
	6 in. hollow tile plastered each side with 5/8 in. 1:3 gypsum and sand plaster (I) _____	1 hr*
	4 in. hollow tile having 2 cells in wall thickness plastered each side with 5/8 in. 1:3 gypsum and sand plaster (I) _____	1 hr*
Composite Block Partitions	2 in. blocks of shredded wood bound with magnesium oxysulfate cement, plastered each side with ½ in. 1:3 gypsum and sand plaster (I) _____	1 hr*
	3 in. blocks as above, plastered as above (I) _____	2 hrs*
Gypsum Block Partitions	2 in. solid blocks, unplastered (F, I) _____	1 hr*
	3 in. hollow blocks, unplastered (I) _____	1 hr*
	3 in. solid blocks, unplastered (F) _____	3 hrs*
	3 in. hollow blocks plastered each side with ½ in. 1:3 gypsum and sand plaster (F) _____	3 hrs*
	4 in. hollow blocks plastered each side as above (F) _____	4 hrs*
Gypsum Plank Partitions	3 in. gypsum plank with tongue and groove joints grouted with gypsum, surfaced one side with 20 gauge corrugated steel panels bolted to gypsum at top and bottom with ½ in. bolts 6 in. on centers. Plank made with 10 percent wood sawdust, and reinforced with 2 in. wire mesh placed ½ in. from each face (HH) _____	4 hrs*
	4¼ in. gypsum plank with tongue and groove joints grouted with gypsum. Plank cast on 22 gauge corrugated (V beam) sheets which form one face. Plank made with 10 percent wood sawdust, and reinforced with 4 in. wire mesh placed ½ in. from gypsum face (II) _____	4 hrs*

*Nonbearing.

FIRE RESISTANCE RATINGS OF WALLS AND PARTITIONS – Continued

Ratings Based on Standard Fire Tests

Type	Details of Construction	Minimum Total Thickness, Ins. for Rating of	
		2 hrs.	1 hr.
Solid Plaster Partitions (Steel framing embedded in plaster)	3/4 in. plaster of 86 parts gypsum, 12 parts sawdust and 2 parts asbestos fiber each side 3/4 in. asbestos lath (medium), with sheet-steel H supports (G) 1:2, 1:3 gypsum and sand plaster on metal lath, on steel studs (G, I) _ _ _ _ _	---	2 1/4 in.*
	1:2, 1:2 gypsum and sand plaster on metal lath on steel studs (NN) _ _ _ _ _	---	2 1/2 in.*
	Unsanded, wood-fibered gypsum plaster on metal lath on steel studs (G, I) _ _ _ _ _	---	2 in.*
	Gunite; 4 1/2:1:7 Portland cement, sawdust and sand mortar sprayed on welded wire fabric on steel studs (G, I) _ _ _ _ _	2 1/4 in.*	
	7/8 in. 1:1 gypsum and sand plaster each side of 3/8 in. gypsum lath, steel stud supports (O) _ _ _ _ _	---	2 1/8 in.*
	3/4 in. 1:2 1/2 gypsum and sand plaster each side 1 in. board of shredded wood bound with magnesium oxysulfate cement, with sheet steel H supports (G, I) _ _ _ _ _	---	2 1/2 in.*
	1:1 gypsum and sand plaster on metal lath on steel studs (I) _ _	---	2 in.*
	1:1/2 gypsum and sand plaster on metal lath on steel studs (I)_	2 1/2 in.*	2 in.*
(Without steel framing)	Gypsum – perlite or gypsum-vermiculite plaster (100 lbs. of gypsum neat plaster to not more than 2 cu. ft. of plaster aggregate for scratch coat and 100 lbs. of neat gypsum plaster to not more than 3 cu. Ft. of plaster aggregate for brown coat) on metal lath attached to steel studs placed flat. _ _ _ _ _	---	1 1/2 in.*
	13/16 in. 1:1, 1:2 gypsum and sand plaster each side 3/8 in. gypsum lath inserted at top and bottom in steel runners (KK) _	---	2 in.*
	3/4 in. 1:1, 1:2 gypsum and sand plaster each side 1/2 in. gypsum lath inserted at top and bottom in steel runners (OO) _	---	2 in.*
	Sanded gypsum plaster (1:2 mix for scratch, brown and back-up coats) applied to each side of metal lath fastened at top and bottom in steel runners. _ _ _ _ _	---	2 in.*

*Nonbearing.

FIRE RESISTANCE RATINGS OF WALLS AND PARTITIONS – Continued

Ratings Based on Standard Fire Tests

Type	Details of Construction	Rating
Steel Stud Brick- Veneered Walls	One side sheathed with 1 in. magnesium oxysulfate impregnated wood fiber board and 3¾ in. brick veneer secured with metal ties to studs every fifth course. Other side faced with 7/8 in. gypsum-vermiculite plaster on metal lath secured to studs (I) _____	2 hrs.
	One side sheathed with paper-backed wire lath and 3 ¾ in. brick veneer secured by filling 1 in. space between brick and lath with mortar. Other side faced with 1 in. paper-enclosed mineral-wool blanket weighing 0.6 lb. per sq. ft. attached to studs, covered with ¾ in. 1:2, 1:3 gypsum and sand plaster (I) _____	4 hrs.
	One side sheathed with ½ in. wood fiberboard sheathing next to studs, ¾ in. air space formed with ¾ by 1 5/8 in. wood strips placed over the fiberboard and secured to the studs; paper-backed wire lath nailed to these strips, 3¾ in. brick veneer held in place by filling a ¾ in. _____	1½ hrs.

FIRE RESISTANCE RATINGS OF WALLS AND PARTITIONS – Continued
Ratings Based on Standard Fire Tests

Type	Details of Construction	Rating
Steel Stud Hollow Partitions Plastered	7/8 in. unsanded, wood-fibered gypsum plaster on metal lath, each side steel studs (G, I) -----	2 hrs.*
	1 in. 1:½, 1:½ gypsum and sand plaster on metal lath each side steel studs (I) -----	2 hrs.*
	7/8 in. 1:1/30:2, 1:1/30:3 Portland cement, asbestos fiber and sand plaster on metal lath each side steel studs (I) -----	1 hr.*
	7/8 in. 1:2, 1:3 gypsum and sand plaster on metal lath, each side steel studs (G, I) -----	1 hr.
	¾ in. unsanded, wood-fibered gypsum plaster on metal lath, each side steel studs (G, I) -----	1½ hrs.
	¾ in. 1:2 Portland cement and sand plaster in the scratch coat, 1:3 gypsum and sand plaster in the brown coat, on metal lath, each side steel studs (G) -----	1 hr.*
	¾ in. 1:2, 1:2 gypsum and sand plaster on metal lath, each side steel studs (G, I) -----	1 hr.
	¾ in. 1:½, 1:½ gypsum and sand plaster on metal lath, each side steel stud (I) -----	1 hr.*
	1 in. unsanded, wood-fibered gypsum plaster on metal lath, each side steel studs (G, I) -----	2 hrs. †
	½ in. 1:1 gypsum and sand plaster on 3/8 in. gypsum lath each side steel studs providing 1¼ in. central air space (O) -----	1 hr.*
Wood Stud Partitions, Plastered Studs 2 x 4 in. or larger. Finished each side as noted	¾ in. 1:1½, 1:3 gypsum and sand plaster on 3/8 in. diamond mesh expanded metal lath of 26 U.S. gauge attached by 1½ in. 4-penny nails 6 in. apart or by equivalent staples. Studs 2 x 2 in. if non-bearing (J) -----	1 hr. Comb.
	Gypsum and sand plaster on a plaster base listed ³ by U.L., Inc., as providing an E-1 Classification; plaster of mix and thickness, and plaster base attached as specified in listing -----	1 hr. Comb.
	½ in. 1:2, 1:3 gypsum and sand plaster on wood lath; stud spaces filled with mineral wool (G, I) -----	1 hr. Comb.
	½ in. 1:2, 1:2 gypsum and sand plaster on 7/8 in. flame-proofed fiberboard plaster base (G, I) -----	1 hr. Comb.
	½ in. 1:2 gypsum and sand plaster on 3/8 in. perforated gypsum lath, one ¾ in. diam. hole or larger for each 16 sq. in. of lath (G, I) -----	1 hr. Comb.
	½ in. 1:2, 1:2 gypsum and sand plaster on 3/8 in. plain gypsum lath attached by nails fitted with 1½ x 1¾ in. metal lath pads folded over heads, spaced 8 in. vertically, 16 in. horizontally (G, I) -----	1 hr. Comb.
	½ in. 4:1 gypsum and sand plaster on 3/8 in. plain gypsum lath, 3in. strips metal lath over all joints (H) -----	1 hr. Comb.

*Non-bearing

† For partitions loaded not to exceed 5,120 lbs. per sq. in. of stud area the rating is 2½ hrs.

FIRE RESISTANCE RATINGS OF WALLS AND PARTITIONS – Continued

Ratings Based on Standard Fire Tests

Type	Details of Construction	Rating
<p>Wood Stud Partitions, Plastered Studs 2x4 in. or larger. Finished each side as noted</p>	7/8 in. 1:2, 1:3 gypsum and sand plaster on metal lath (G, I) _ _ _ _	1 hr. Comb.
	7/8 in. 1:1/10:1/30:2 Portland cement, lime, asbestos fiber, sand and 1:3 gypsum and sand plaster on metal lath (G) _ _ _ _ _ _ _ _ _ _	1 hr. Comb.
	3/4 in. 1:2, 1:2 gypsum and sand plaster on metal lath (G, I) _ _ _ _	1 hr. Comb.
	3/4 in. 1:2, 1:2 gypsum and sand plaster on metal lath; stud spaces filled with mineral wool (G, I) _ _ _ _ _ _ _ _ _ _	1½ hr. Comb.
	3/4 in. unsanded, wood-fibered gypsum plaster on metal lath (G, I) _	1½ hr. Comb.
	7/8 in. 1:1/30:2, 1:1/30:3 Portland cement, asbestos fiber and sand plaster on metal lath (G, I) _ _ _ _ _ _ _ _ _ _	1 hr. Comb.
	3/4 in. gypsum-vermiculite plaster on metal lath. Plaster mix, 100 lb. fibered gypsum to 2½ cu. ft. vermiculite in scratch coat, and 100 lb. Gypsum to 3½ cu. ft. vermiculite in brown coat. Other details as specified in U.L., Inc, listing [®] of vermiculite plaster aggregate _	1 hr. Comb.
<p>Wood Stud Partitions Without Plaster Studs 2x4 in. or larger. Finished each side as noted</p>	Two layers 3/8 in. gypsum wallboard glued together, fastened with 1 7/8 in. nails; joints fitted and nail heads covered with joint cement. Other details as specified in U.L., Inc., listing [®] of the wallboard _	1 hr. Comb.
	5/8 in. gypsum wallboard fastened with 1 7/8 in. nails; joints covered with fiber tape and joint cement. Other details as specified in U.L., Inc., listing [®] of the wallboard _ _ _ _ _ _ _ _ _ _	1 hr. Comb.
	4 in. strips of 3/8 in. gypsum board over edges of studs under facing of 3/16 in. cement-asbestos board; filling of mineral wool bats (I)_	1 hr. Comb.
	3/16 in. cement-asbestos boards over 3/8 in. gypsum wallboard (I) _	1 hr. Comb.
	5/32 in. cement-asbestos shingles laid over 14 lb. per 100 sq. ft. asbestos felt over ¾ wood sheathing on one side; 4 in. strips of ½ in. gypsum board over edges of studs under facing of 3/16 in. cement asbestos board on other side; filling of mineral wool bats (I) _ _ _ _ _ _ _ _ _ _	1 hr. Comb.
	½ in. gypsum wallboard, stud spaces filled with mineral wool bats nailed in place (G, I) _ _ _ _ _ _ _ _ _ _	1 hr. Comb.
	Two layers ½ in. gypsum wallboard. First layer attached with 1 5/8 in. nails having 7/32 in. heads; second layer attached with 1 7/8 in. nails having ¼ in. heads. Outside joints taped and pointed and nail heads covered with joint cement (LL) _ _ _ _ _ _ _ _ _ _	1 hr. Comb. or 1½ hr. Comb.*
	½ in. gypsum wallboard, listed by U.L., Inc., nailed 7 in. O.C. with 1 5/8 in. 5d, cement coated common nails. Outside joints taped and nail heads covered with joint cement [®] _ _ _ _ _ _ _ _ _ _	¾ hr. Comb.

FIRE RESISTANT RATINGS OF WALLS AND PARTITIONS – Continued

Ratings Based on Standard Fire Tests

Type	Details of Construction	Rating
Wood Partitions, Solid	6 in. partition of 2 by 6 lumber; pieces nailed together flatwise; in vertical position if load bearing (JJ) _ _ _ _ _	1 hr. Comb.
Wood Stud Exterior Walls Studs 2x4 in. or larger	One side sheathed with ½ in. gypsum sheathing covered with wood drop siding; other side faced with ½ in. 1:2 gypsum and sand plaster on 3/8 in. perforated gypsum lath (MM) _	1 hr. Comb.

*Non-bearing

FIRE RESISTANCE RATINGS OF COLUMN PROTECTIONS

Ratings Based on Standard Fire Tests

Type	Details of Protection	Minimum Thickness ¹² Inches, for Rating of			
		4 hrs.	3 hrs.	2 hrs.	1 hr.
Cast Iron Columns 7 in. diam. or larger ¹³	Hollow clay tile with outside wire ties ¹⁷ ; ¾ in. mortar between tile and column; no fill (Z) _____	---	2		
	Plaster, 1:1/10:2½ (by volume) Portland cement, lime and sand on ¾ in.-rib metal lath, plaster pushed through so as to leave not over ½ in. air space; no fill (Z) _____	---	---	1½	
	Concrete, coarse aggregate cinders ¹⁵ , 1:2:5 mix; no fill (Z) _____	---	---	2	
Reinforced Concrete²⁵ Columns	Concrete, coarse aggregate limestone, calcareous ¹⁴ gravel, trap rock or blast furnace slag; 12 in. or larger round or square columns ¹³ (AA) _____	1½			
	Concrete, coarse aggregate granite, sandstone, or siliceous gravel ¹⁹ ; 16 in. or larger round or square columns ¹³ (AA) _____	2½	1½		
	Concrete, coarse aggregate granite, sandstone or siliceous gravel ¹⁹ ; light 2 in. mesh expanded metal centrally located in the protective covering. (AA) _ _ 14 in. or larger round or square columns ¹³ _____	1½			
	12 in. or larger round or square columns ¹³ _____	---	1½		
Concrete, ½ in. coarse aggregate granite, sandstone or siliceous gravel ¹⁹ , covered with 1 in. 1:2½ (by volume) Portland cement and sand or gypsum and sand plaster, with admixture of not over ½ part lime; surface of column hacked or column cast in metal lath form, 16 in. or larger round or square columns ¹³ (AA) _____	1½				
Steel Columns 6 x 6 in. or larger ¹³	Brick (clay) with brick fill (Z) _____	3¾	3¾	3¾	2¼
	Concrete, coarse aggregate limestone or calcareous ¹⁴ gravel; fill of same material, (I, Z)				
	6 x 6 in. or larger _____	2	1½	1	1
	8 x 8 in. or larger _____	1½	1	1	1
12 x 12 in. or larger _____	1	1	1	1	

FIRE RESISTANCE RATINGS OF COLUMN PROTECTIONS – Continued

Ratings Based on Standard Fire Tests

Type	Details of Protection	Minimum Thickness ¹² Inches, for Rating of			
		4 hrs.	3 hrs.	2 hrs.	1 hr.
Steel Columns 6 x 6 in. or larger ¹³	Concrete, coarse aggregate trap rock; fill of same material; steel wire ties ¹³ (I, Z)				
	6 x 6 in. or larger -----	2½	2	1½	1
	8 x 8 in. or larger -----	2	1½	1	1
	12 x 12 in. or larger -----	1½	1	1	1
	Concrete, coarse aggregate granite, sandstone or cinders ¹⁵ ; fill of same material; steel wire ties ¹⁶ (I, Z)				
	6 x 6 in. or larger -----	3	2	2	1
	8 x 8 in or larger -----	3	2	1½	1
	12 x 12 in. or larger -----	2	1½	1	1
	Concrete, coarse aggregate siliceous ²⁵ gravel; fill of same material; steel wire ties ⁽¹⁶⁾ , (I, Z)				
	6 x 6 in. or larger -----	4½	3½	2½	1½
	8 x 8 in. or larger -----	4	3	2	1
	12 x 12 in or larger -----	3	2	1½	1
	Concrete block, hollow, cinder; fill of cinder concrete slabs and mortar with 1¼ in. mortar between columns and blocks ¹⁸ (CC) -----	3			
	Gypsum block, solid; corrugated metal ties or 3/8 in. metal mesh in horizontal joints; gypsum block or poured gypsum fill; ¾ in. gypsum mortar between column and block (Z) -----	4	---	2	
Gypsum concrete, poured; fill of same material; 4 x 4 in. wire mesh reinforcement wrapped around column ²⁰ (BB) -----	2				
Gypsum block, solid; plastered with ½ in. gypsum and sand plaster; 7/8 in. 12 gauge metal cramps set in holes drilled in blocks to link adjacent blocks of the same course together; no fill (BB) -----	2				
Gypsum block, solid; unplastered; 7/8 in. 12 gauge metal cramps set in holes drilled in blocks to link adjacent blocks of same course together, no fill (BB) -----	---	---	2		
Gypsum block, solid; wire lath strips laid in horizontal joints; fill of gypsum block and mortar with ½ in. mortar between column and blocks and with ½ in. gypsum and sand plaster on outside (BB) -----	2				

FIRE RESISTANCE RATINGS OF COLUMN PROTECTION – Continued

Ratings Based on Standard Fire Tests

Type	Details of Protection	Minimum Thickness ¹² Inches, for Rating of			
		4 hrs.	3 hrs.	2 hrs.	1 hr.
Steel Columns 6 x 6 in. or larger ¹³	Gypsum block, hollow; covered with 1/2 in. gypsum and sand plaster; 7/8 in. 12 gauge metal cramps linking adjacent blocks of same course; 1/4 in. mortar between column flange and block; no fill (BB) _ _ _	3			
	Gypsum block, hollow; unplastered; 7/8 in. 12 gauge metal cramps linking adjacent blocks of same course; no fill (BB) _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _	---	---	3	
	Hollow clay tile, two 2 in. layers; 1/2 in. mortar between tile and column; 3/4 in. mortar between tile and column; 3/8 in. metal mesh in horizontal joints; hollow clay tile fill (Z) _ _ _ _ _ _ _ _ _ _ _ _	4			
	Hollow clay tile plastered with 3/4 in. 1:3 (by volume) gypsum and sand plaster; 3/8 in. metal mesh in horizontal joints; limestone concrete fill (Z) _ _ _ _ _	2			
	Hollow clay tile plastered with 5/8 in. 1:2 1/2 (by volume) lime and sand plaster; 1 1/8 in. mortar between tile and column, 3/8 in. metal mesh in horizontal joints; limestone concrete fill (Z) _ _ _ _ _ _ _ _ _ _	4			
	Hollow clay tile with outside wire ties ¹⁷ or with 3/8 in. metal mesh in horizontal joints; limestone or trap rock concrete fill, extending 1 in. outside column on all sides (Z) _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _	---	2		
	Hollow clay tile with outside wire ties ¹⁷ with or without concrete fill; 3/4 in. mortar between tile and column (Z) _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _	---	---	---	2
	Plaster, 1:1/10:2 1/2 (by volume) Portland cement, lime and sand on metal lath; no fill (Z) _ _ _ _ _ _ _ _ _ _	---	---	---	1
Plaster, two 7/8 in. layers 1:1/10:2 1/2 (by volume) Portland cement, lime and sand on metal lath; 3/4 in. air space between layers; no fill (Z) _ _ _ _ _ _ _ _ _ _	---	---	2 1/2		

FIRE RESISTANCE RATINGS OF COLUMN PROTECTIONS – Continued

Ratings Based on Standard Fire Tests

Type	Details of Protection	Rating
Steel Columns	1 in. gypsum-vermiculite plaster on metal lath spaced 1¼ in. from column and applied so as to fill space behind lath on flange faces with plaster, and with plaster pressed similarly through lath at other locations. Plaster mix, 100 lb. fibered gypsum to 2 ½ cu. ft. vermiculite in scratch coat and 100 lb. fibered gypsum to 3½ cu. ft. vermiculite in brown coat. Other details as specified in U.L., Inc., listing® of vermiculite plaster aggregate. No fill _ _	3 hrs.
	7/8 in. gypsum-vermiculite plaster (measured from face of lath) on metal lath spaced 1 in. from column. Plaster mix, 4:1 by weight or approx. 100 lbs. fibered gypsum to 2½ cubic feet vermiculite. Loose vermiculite fill (FF) _	4 hrs.
	1½ in. gypsum-vermiculite plaster (proportioned 100 lbs. of gypsum neat plaster to not more than 2 cu. ft. of vermiculite plaster aggregate for the scratch coat, and 100 lbs. of neat gypsum plaster to not more than 3 cu. ft. of vermiculite plaster aggregate for the brown coat) on metal lath; lath spaced 1¼ in. from column; space between lath and column flanges filled with plaster; no back-fill _ _ _ _ _	4 hrs.
	Two ¾ in. layers of 1:3 gypsum and sand plaster or two 1 in. layers of 1:2½ Portland cement and sand plaster, on metal lath, with ¾ in. air space between the two layers; no fill (I) _ _ _ _ _	2½ hrs.
	¾ in. 1:3 gypsum and sand plaster or 1 in. 1: 2½ Portland cement and sand plaster, on metal lath (I) _ _ _ _ _	1 hr.

FIRE RESISTANCE RATINGS OF BEAM, GIRDER AND TRUSS PROTECTIONS

Ratings Based on Standard Fire Tests

Type	Details of Protection	Minimum Thickness ¹² Inches, for Rating of			
		4 hrs.	3 hrs.	2 hrs.	1 hr.
Steel Beams, Girders and Trusses individually protected	Clay tile or concrete block; plastered with ½ in. Portland cement or gypsum plaster _ _ _ _ _	---	---	2	2
	Clay tile or concrete block; plastered with ½ in. Portland cement or gypsum plaster; all spaces between member and tile or block filled solid _ _ _	---	2	2	2
	Clay tile or concrete block; unplastered _ _ _ _ _	---	---	---	2
	Clay tile or concrete block; unplastered; all spaces between member and tile or block filled solid _ _ _	---	---	2	2
	Concrete Group 1 coarse aggregates ¹¹ ; metal ties bent around beam flanges and other projecting parts _	2	2	1½	1
	Concrete, Group 2 coarse aggregates ¹¹ ; with 3 in. or finer metal mesh placed 1 in. from the finished surface _ _ _ _ _	2½	2½	2	1½
	Brick, hollow or solid (clay, concrete or sand-lime) _ _	3¾	3¾	2¼	2¼
	Gypsum blocks, hollow; plastered with ½ in. gypsum plaster _ _ _ _ _	3	3	2	2
	Gypsum blocks, hollow; unplastered; joints grouted _	---	3	2	2
	Gypsum blocks, solid; plastered with ½ in. gypsum plaster _ _ _ _ _	2	2	2	2
	Gypsum blocks, solid; unplastered; joints grouted _ _	---	---	2	2
	Gypsum poured; plastered with ½ in. gypsum plaster _	1½	1½	1	½
Gypsum poured; unplastered _ _ _ _ _	2	2	1½	1	
Type	Details of Protection	Rating			
Steel Beams, Girders and Trusses individually protected	¾ in. 1:3 gypsum and sand plaster on metal lath _ _ _ _ _	1 hr.			
	1 in. 1:2½ Portland cement and sand plaster on metal lath _ _ _ _ _	1 hr.			
	Two 7/8 in. layers 1:2½ Portland cement and sand plaster on metal lath, with ¾ in. air space between _ _ _ _ _	2 hrs.			
	Two ¾ in. layers of 1:3 gypsum and sand plaster on metal lath, with ¾ in. air space between _ _ _ _ _	2½ hrs.			

**FIRE RESISTANCE RATINGS OF BEAM, GIRDER AND TRUSS PROTECTIONS -
Continued**

Ratings Based on Standard Fire Tests

Type	Details of Protection	Rating
Steel Beams, Girders and Trusses protected by a suspended ceiling ¹⁰	Ceiling of 7/8 in. Gypsum-vermiculite plaster on metal lath attached so as to provide at least 2½ in. air space between protected structural members and the lath. Plaster mix, 100 lb. fibered gypsum to 2½ cu. ft. vermiculite in scratch coat, 100 lb. to 3½ cu. ft. in brown coat, and 100 lb. to 1½ cu. ft. in finish coat. Other details as specified in U.L., Inc. listing ³ of vermiculite plaster aggregate (FF) _____	4 hrs.
	Ceiling of 1 in. gypsum-vermiculite plaster on metal lath. Ratio of gypsum to vermiculite: 100 lbs. of gypsum to 2½ cu. ft. of vermiculite for scratch coat and 100 lbs. of gypsum to 3½ cu. ft. of vermiculite for brown coat; 2½ in. air space between structural member and inner surface of lath. Top of structural member protected with 2 in. concrete or gypsum slab _____	4 hrs.
	Ceiling of 7/8 in. gypsum-vermiculite plaster on metal lath. Ratio of gypsum to vermiculite: 100 lbs. of gypsum to 2½ cu. ft. of vermiculite. Lath placed 1 in. from lower flange; 2 in. concrete or gypsum slab over top flange of structural member _____	3 hrs.
	Ceiling of 7/8 in. gypsum-vermiculite plaster (measured from face of lath) on metal lath. Plaster mix, 4:1 by weight or approx. 100 lbs. fibered gypsum to 2½ cu. ft. vermiculite (FF) _____	3 hrs.
	Ceiling of ¾ in. of 1:2, 1:3 gypsum and sand plaster on metal or wire lath _____	2 hrs. ²⁷
	Ceiling of ¾ in. sanded gypsum plaster (1:2 for scratch coat and 1:3 for brown coat) on metal lath _____	1 hr.
	Ceiling of ¾ in. Portland cement plaster on metal lath, the proportioning of the plaster to be not leaner than 1:2 for scratch coat and 1:3 for brown coat, with 15 lbs. of hydrated lime and 3 lbs. of short asbestos fiber per bag of Portland cement _____	1 hr.

Estimated Ratings

Type	Details of Protection	Minimum Thickness ¹² Inches, for Ratings of			
		4 hrs.	3 hrs.	2 hrs.	1 hr.
Reinforced Concrete Beams, Girders and Trusses	Concrete, Group 1 coarse aggregates ¹¹ _____	1½	1½	1½	1
	Concrete, Group 2 coarse aggregates ¹¹ _____	2½	2½	2	1½
	Concrete, Group 2 coarse aggregates ¹¹ , 3 in. or finer metal mesh located centrally in the protective covering _____	2	1½	1½	1

FIRE RESISTANCE RATINGS OF FLOOR AND ROOF CONSTRUCTIONS

Ratings Based on Standard Fire Tests

Type	Details on Construction (See Note ²¹)	Rating
Reinforced Concrete Solid Slab	Reinforced concrete slab with 3/4 in. minimum outside protection for reinforcement: 4 1/2 in. thick slab ----- 4 in. thick slab ----- 3 1/2 in. thick slab ----- 2 1/2 in. thick slab -----	2 1/2 hrs. 2 hrs. 1 1/2 hrs. 1 hr.
Concrete Joist Construction	Reinforced concrete top slab on concrete joists not less than 4 in. wide and not over 30 in. on centers with 3/4 in. minimum protection for reinforcement, and having plastered ceiling on metal or wire lath. 2 1/2 in. top slab; ceiling 1 in. unsanded gypsum plaster ----- 2 1/4 in. top slab; ceiling 3/4 in. sanded gypsum plaster (mix 1:2, 1:3) 2 in. top slab; ceiling 3/4 in. sanded gypsum plaster (mix 1:2, 1:3) or 3/4 in. sanded Portland cement plaster (mix 1:3 with 15 lbs. of hydrated lime and 3 lbs. of short asbestos fiber per bag of cement) ----- 2 in. top slab; ceiling 3/4 in. sanded gypsum plaster (mix 1:2, 1:3) or 3/4 in. sanded Portland cement plaster (mix 1:3 with 15 lbs. of hydrated lime and 3 lbs. of short asbestos fiber per bag of cement) -----	3 hrs. 2 hrs. 1 1/2 hrs. 1 hr.

Estimated Ratings

Type	Details of Construction	Rating
Reinforced Concrete Joists (Not over 30 in. on centers)	2 1/2 in. reinforced ²³ concrete floor slab on joists. Ceiling of 1 in. unsanded, wood-fibered gypsum plaster, or 3/4 in. gypsum-vermiculite plaster proportioned within the range of 2 1/2 to 5 1/2 cu. ft. vermiculite per 100 lb. Gypsum, on metal lath ----- 2 1/4 in. reinforced ²³ concrete floor slab on joists. Ceiling of 3/4 in. 1:2, 1:3 gypsum and sand plaster on metal lath -----	3 hrs. 2 hrs.

Ratings Based on Standard Fire Tests

Concrete and Tile	Tile and concrete composite construction consisting of tile fillers of concrete, gypsum, or structural clay tile not less than 4 in. deep, with reinforced concrete ribs (3/4 in. protection for reinforcement) and concrete top slab not less than 2 in. thick ----- Tile and concrete, composite construction as prescribed above except omitting the top slab and having a gypsum plastered ceiling -----	2 1/2 hrs. 1 1/2 hrs.
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**FIRE RESISTANCE RATINGS OF FLOOR AND ROOF CONSTRUCTIONS –
Continued**

Ratings Based on Standard Fire Tests

Type	Details of Construction (See Note ²¹)	Rating
Gypsum	Poured reinforced gypsum slab at least 3 in. thick having ¾ in. minimum protection for reinforcement and with a ceiling of gypsum plaster _ _ _ _ _	2½ hrs.

Estimated Ratings

Brick Arch	Minimum depth 4 in. for spans of 5 ft. or less; rise at least 1 in. per ft. of span; at least 2 in. concrete fill on top of arch; ceiling plastered with ¾ in. Portland cement or gypsum plaster. (W) _ _ _ _ _ Minimum depth 8 in.; rise at least 1 in. per ft. of span. (W) _ _ _ _ _	3 hrs. 3 hrs.
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Ratings Based on Standard Fire Tests

Brick Arch	Brick arch not less than 4 in. deep with a level concrete fill 2 in. above crown _ _ _ _ _	2½ hrs.
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Estimated Ratings

Hollow Clay Tile Arch	Minimum depth 6 in. with at least 2 cells in the depth; shells and webs not less than 5/8 in. in thickness; vertical and horizontal dimension of cells not greater than 4 in.; at least 2 in. concrete fill on top of arch; ceiling plastered with ¾ in. Portland cement or gypsum plaster. (X) _ _ _ _ _	3 hrs.
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Ratings Based on Standard Fire Tests

Hollow Clay Tile Arch	Flat arch of clay tile, 2-cell structural tile not less than 8 in. deep, with floor fill of incombustible material at least 2 in. thick and having gypsum plaster ceiling _ _ _ _ _	2½ hrs.
	Segmental arch of clay tile, 2-cell structural tile not less than 6 in. deep, laid in cement mortar with concrete fill level with crown of arch, and having gypsum plaster ceiling _ _ _ _ _	2½ hrs.

**FIRE RESISTANCE RATINGS OF FLOOR AND ROOF CONSTRUCTIONS –
Continued**

Ratings Based on Standard Fire Tests

Type	Details of Construction (see note ²¹)	Rating
Cellular Steel Floor and Roof Units	<i>Top Deck</i> – 2 in. cinder concrete (minimum thickness over cells.) <i>Ceiling</i> – 7/8 in. vermiculite-gypsum or perlite-gypsum plaster (mix 100 lbs. gypsum to 2½ cu. ft. aggregate) on metal lath _	4 hrs.
	<i>Top Deck</i> – 2 in. concrete (minimum thickness over cells). <i>Ceiling</i> – 1 in. vermiculite-gypsum or perlite-gypsum plaster on metal lath _ _ _ _ _	4 hrs.
	<i>Top Deck</i> – 2½ in. concrete (minimum thickness over cells). <i>Ceiling</i> – 5/8 in. vermiculite-gypsum plaster plus ½ in. vermiculite acoustic plastic on metal lath _ _ _ _ _	4 hrs.
	<i>Top Deck</i> – 2 in. concrete (minimum thickness over cells). <i>Ceiling</i> – 1 in. unsanded gypsum plaster on metal lath _ _ _ _ _	4 hrs.
Steel Roof Deck Construction	<i>Deck</i> – Steel deck covered with not less than 2 in. nominal thickness of vermiculite concrete, or equivalent. <i>Ceiling</i> – 1 in. vermiculite-gypsum plaster (mix 100 lbs. of gypsum to 2½ cu. ft. of vermiculite) on metal lath _ _ _ _ _	4 hrs.
	<i>Deck</i> – Steel deck covered with not less than 1 in. nominal thickness of insulation board consisting of shredded wood bonded with Portland cement, or equivalent. <i>Ceiling</i> – 1 in. vermiculite-gypsum plaster (mix 100 lbs. of gypsum to 2½ cu. ft. of vermiculite) on metal lath _ _ _ _ _	3 hrs.
	<i>Deck</i> – Steel deck covered with not less than 1 in. nominal thickness of insulation board consisting of felted glass fiber or equivalent. <i>Ceiling</i> – 1 in. vermiculite-gypsum plaster (mix 100 lbs. of gypsum to 2½ cu. ft. of vermiculite) on metal lath _ _ _ _ _	2 hrs.
	<i>Deck</i> – Steel deck covered with not less than 1½ in. nominal thickness of wood fiber-board insulation, or equivalent. <i>Ceiling</i> – 1 in. sanded gypsum plaster (mix 1:2) on metal lath _ _	2 hrs.
	<i>Deck</i> – Steel deck covered with not less than 1½ in. nominal thickness of insulation consisting of wood fiber and a cement binder, or equivalent. <i>Ceiling</i> – 7/8 in. sanded gypsum plaster (mix 1:2) on metal lath _	2 hrs.
	<i>Deck</i> – Steel deck covered with not less than 1 in. nominal thickness of wood fiber-board insulation, or equivalent. <i>Ceiling</i> – ¾ in. sanded gypsum plaster (mix 1:2, 1:3) on metal lath _ _ _ _ _	1½ hrs.

FIRE RESISTANCE RATINGS OF FLOOR AND ROOF CONSTRUCTION – Continued

Ratings Based on Standard Fire Tests

Type	Details of Construction (See Note ²¹)	Rating
Steel Roof Deck	Steel deck covered with not less than 2 in. nominal thickness of vermiculite concrete, or equivalent, and supported on steel framing protected with a suspended ceiling of metal or wire lath and 1 in. gypsum-vermiculite plaster, ratio of gypsum to vermiculite: 100 lbs. of gypsum to 2½ cu. ft. of vermiculite (for scratch and brown coats). (UU) _ _ _ _ _	4 hrs.
	Steel deck covered with not less than 1¾ in. nominal thickness of insulation board consisting of shredded wood bonded with Portland cement, or equivalent, and supported on steel framing protected with a suspended ceiling as prescribed in Item (a) above. (UU) _ _ _ _ _	3½ hrs.
	Steel deck covered with not less than 1 in. nominal thickness of insulation board consisting of shredded wood bonded with Portland cement, or equivalent, and supported on steel framing protected with a suspended ceiling as prescribed in Item (a) above. (UU) _ _ _ _ _	3 hrs.
	Steel deck covered with not less than 1 in. nominal thickness of insulation board consisting of felted glass fiber, or equivalent, and supported on steel framing protected with a suspended ceiling as prescribed in Item (a) above. (UU) _ _ _ _ _	2 hrs.
	Steel deck covered with not less than 1½ in. nominal thickness of wood fiber-board of insulation, or equivalent, and supported on steel framing protected with a suspended ceiling of metal or wire lath and 1 in. sanded gypsum plaster (1:2 mix for scratch and brown coats). (UU) _ _ _ _ _	2 hrs.
	Steel deck covered with not less than 1½ in. nominal thickness of insulation consisting of wood fiber and a cement binder, or equivalent, and supported on steel framing protected with a suspended ceiling of metal or wire lath and 7/8 in. sanded gypsum plaster (1:2 mix for scratch and brown coats.) (UU) _ _	2 hrs.
	Steel deck covered with not less than 1 in. nominal thickness of wood fiber-board insulation, or equivalent, and supported on steel framing protected with a suspended ceiling of metal or wire lath and ¾ in. sanded gypsum plaster (1:2 mix for scratch coat and 1:3 for brown coat). (UU) _ _ _ _ _	1½ hrs.

FIRE RESISTANCE RATINGS OF FLOOR AND ROOF CONSTRUCTIONS – Continued

Ratings Based on Standard Fire Tests

Type	Details of Construction (See Note ²¹)	Rating
Steel Joist Construction and Formed Steel Members (Using Contact, Furred, or Suspended Ceilings)	<i>Top Slab</i> – 2½ in. poured concrete top slab or 2 in. precast gypsum tile, the latter with ½ in. mortar finish; or 2 in. reinforced gypsum concrete slab on ½ in. gypsum wallboard. <i>Ceiling</i> – 1 in. vermiculite-gypsum plaster on metal or wire lath _ _ _	4 hrs.
	<i>Top Slab</i> – 2½ in. poured concrete top slab, 2½ in. vermiculite-concrete or perlite-concrete top slab, or 2 in. precast gypsum tile, the latter with ½ in. mortar finish. <i>Ceiling</i> – ¾ in. vermiculite-gypsum or perlite-gypsum plaster or 1 in. unsanded gypsum plaster on metal or wire lath _ _ _ _ _	3 hrs.
	<i>Top Slab</i> – 2 in. poured concrete top slab; or 2 ¾ in. Portland cement concrete plank. <i>Ceiling</i> – 1 in. vermiculite-gypsum plaster on metal or wire lath _ _ _	3 hrs.
	<i>Top Slab</i> – 2½ in. poured concrete top slab. <i>Ceiling</i> – 7/8 in. sanded gypsum plaster (mix 1:2) on metal or wire lath _ _ _ _ _	2½ hrs.
	<i>Top Slab</i> – 2 in. poured concrete top slab or 2 in. precast gypsum tile, the latter with ¼ in. mortar finish. <i>Ceiling</i> – ¾ in. vermiculite-gypsum or 1 in. unsanded gypsum plaster on metal or wire lath _ _ _ _ _	2½ hrs.
	<i>Top Slab</i> – 2¼ in. poured concrete top slab or 2 in. precast gypsum tile, the latter with ¼ in. mortar finish. <i>Ceiling</i> – ¾ in. sanded gypsum plaster (mix 1:2, 1:3) on metal or wire lath _ _ _ _ _	2 hrs.
	<i>Top Slab</i> – 2 in. poured concrete top slab; or 2 in. precast gypsum tile. <i>Ceiling</i> – ¾ in. sanded gypsum plaster (mix 1:2, 1:3) or ¾ in. sanded Portland cement plaster (mix 1:2, 1:3 – with 15 lbs. hydrated lime and 3 lbs. short asbestos fiber per bag of Portland cement) on metal or wire lath _ _ _ _ _	1½ hrs.
	<i>Top Slab</i> – 1 in. nominal single wood floor on wood nailers applied to steel deck with insulating paper cemented thereto; or double wood deck on wood nailers attached to steel joints or formed steel members. <i>Ceiling</i> – ¾ in. sanded gypsum plaster (mix 1:2, 1:3); or ¾ in. sanded Portland cement plaster (mix 1:2, 1:3 – with 15 lbs. hydrated lime and 3 lbs. short asbestos fiber per bag of Portland cement) on metal or wire lath _ _ _ _ _	1 hr.

**FIRE RESISTANCE RATINGS OF FLOOR AND ROOF CONSTRUCTIONS –
Continued**

Ratings Based on Standard Fire Tests

Type	Details of Construction (See Note ²¹)	Rating
Steel Joists Construction and Formed Steel Members	<p><i>Top Slab</i> – 2 in. concrete on steel plate deck. <i>Ceiling</i> – 2 in. reinforced gypsum tile, with ½ in. 1:3 gypsum and sand plaster. Tile clipped to channels which are clipped to joists _ _ _ _ _</p>	4 hrs.
	<p><i>Top Slab</i> – 2 in. poured concrete top slab. <i>Ceiling</i> – ¾ in. furring channels, spaced 12 in., 3/8 in. perforated gypsum lath attached to furring channels with approved interlocking wire clips; 1 in. gypsum-perlite plaster (100:2, 100:3), reinforced with 1 in. 20 gage diamond mesh attached to furring channels _ _ _</p>	4 hrs.
	<p><i>Top Slab</i> – 2 in. poured concrete top slab. <i>Ceiling</i> – ¾ in. furring channels, spaced 12 in., 3/8 in. perforated gypsum lath attached to furring channels with approved interlocking wire clips; 5/8 in. gypsum-perlite plaster (100:2, 100:3), reinforced with 14 gage galvanized wire below lath and diagonally between interlocking device of wire clips _ _ _ _ _</p>	3 hrs.
	<p><i>Top Slab</i> – 2 in. poured concrete top slab. <i>Ceiling</i> – ¾ in. furring channels, spaced 16 in., 3/8 in. perforated gypsum lath attached to furring channels with approved interlocking clips; ½ in. gypsum-perlite plaster (100:2½) reinforced with 1 in. 20 gage diamond mesh attached to furring channels _ _ _ _ _</p>	3 hrs.
	<p><i>Top Slab</i> – 2½ in. concrete on steel plate deck. <i>Ceiling</i> – 1 in. unsanded, wood-fibered gypsum plaster, or ¾ in. gypsum-vermiculite plaster proportioned within the range of 3½ to 5½ cu. ft. vermiculite per 100 lb. Gypsum, on metal lath _ _ _ _ _</p>	3 hrs.
	<p><i>Top Slab</i> – 2½ in. cinder concrete plus ½ in. cement mortar finish, on steel plate deck. <i>Ceiling</i> – 1 1/8 in. 1:1 sanded gypsum plaster on metal lath _ _ _ _ _</p>	3 hrs.
	<p><i>Top Slab</i> – 2½ in. reinforced gypsum concrete on 3/8 in. gypsum plaster boards, or 2½ in. cinder concrete on metal floor lath. <i>Ceiling</i> – 2 in. precast, reinforced gypsum ceiling tile finished with ½ in. 1:1 sanded gypsum plaster _ _ _ _ _</p>	3 hrs.
	<p><i>Top Slab</i> – 2½ in. reinforced gypsum concrete on ½ in. gypsum plaster board. <i>Ceiling</i> – 2½ in. reinforced gypsum concrete attached to bottom of joists, plastered with ¾ in. sanded gypsum plaster; reinforced 1 in. above bottom of ceiling slab _ _ _ _ _</p>	3 hrs.

**FIRE RESISTANCE RATINGS OF FLOOR AND ROOF CONSTRUCTIONS –
Continued**

Ratings Based on Standard Fire Tests

Type	Details of Construction (See Note ²¹)	Rating
Steel Joist Construction and Formed Steel Members (cont.)	<i>Top Slab</i> – 2 in. precast reinforced gypsum slabs on joists; joints grouted with gypsum. <i>Ceiling</i> – 2 in. precast, reinforced gypsum attached to bottoms of joists; joints grouted with gypsum; plastered with ¾ in. sanded gypsum plaster _____	3 hrs.
	<i>Top Slab</i> – 2½ in. concrete on steel plate deck. <i>Ceiling</i> – 1 in. 1:2 gypsum sanded gypsum plaster _____	2½ hrs.
	<i>Top Slab</i> – 2 in. concrete on steel plate deck. <i>Ceiling</i> – 1 1/8 in. 1:1 sanded gypsum plaster, on metal lath; or 1½ in. 1:2 sanded gypsum plaster on ribbed metal lath _____	2½ hrs.
	<i>Top Slab</i> – 2 in. concrete on steel plate deck. <i>Ceiling</i> – ¾ in. 1:2, 1:3 sanded gypsum plaster, or 1 in. 1:2, 1:2½ Portland cement and sand plaster with 10 lb. hydrated lime added per bag cement, on metal lath _____	2 hrs.
	<i>Top Slab</i> – 2 in. concrete on steel plate deck. <i>Ceiling</i> – 2 in. interlocking unreinforced gypsum tile supported on upper face of lower beam flange, with ½ in. 1:3 sanded gypsum plaster _	2 hrs.
	<i>Top Slab</i> – 2 in. poured concrete top slab. <i>Ceiling</i> – ¾ in. furring channels, space 16 in., 3/8 in. perforated gypsum lath attached to furring channels with approved interlocking wire clips; ½ in. gypsum-perlite plaster (100:2½) reinforced with 14 gage galvanized wire below lath and diagonally between interlocking device of wire clips _____	2 hrs.
	<i>Top Slab</i> – 2 in. poured concrete top slab. <i>Ceiling</i> – ¾ in. furring channels, space 16 in., 3/8 in. perforated gypsum lath attached to furring channels with approved interlocking wire clips; 1 in. of gypsum-perlite plaster (100:2, 100:3) _____	1½ hrs.
	<i>Top Slab</i> – 1½ in. concrete on steel plate deck. <i>Ceiling</i> – ¾ in. 1:2, 1:3 sanded gypsum plaster on metal lath _____	1½ hrs.

**FIRE RESISTANCE RATINGS OF FLOOR AND ROOF CONSTRUCTIONS –
Continued**

Ratings Based on Standard Fire Tests

Type	Details of construction (See Note ²¹)	Rating
Steel Joist Construction and Formed Steel Members (cont.)	<i>Top Slab</i> – 2 in. poured concrete top slab. <i>Ceiling</i> – ¾ in. furring channels, spaced 16 in., 3/8 in. perforated gypsum lath attached to furring channels with approved interlocking wire clips; 5/8 in. gypsum-perlite plaster (100:2½) _ _ _ _ _	1 hr.
	<i>Top Slab</i> – 1 in. concrete on steel plate deck. <i>Ceiling</i> – ¾ in. 1:2, 1:3 sanded gypsum plaster on metal lath _	1 hr.
	<i>Top Slab</i> – 7/8 in. wood flooring nailed to wood sleepers on covering of asbestos paper weighing 14 lbs. per 100 sq. ft. cemented on steel plate base.	
	<i>Ceiling</i> – ¾ in. 1:2, 1:3 sanded gypsum plaster on metal lath _	1 hr. comb.

**FIRE RESISTANCE RATINGS OF FLOOR AND ROOF CONSTRUCTIONS –
Continued**

Ratings Based on Standard Fire Tests

Type	Details of Construction (See Note ²¹)	Rating
Wood Joist Construction	<i>Ceiling Protection</i> – ¾ in. sanded gypsum plaster (mix 1:2, 1:3) or ¾ in. sanded Portland cement plaster (mix 1:2, 1:3 – with 15 lbs. of hydrated lime and 3 lbs. of short asbestos fiber per bag of Portland cement) – plaster shall be applied to metal lath which shall be attached to joists as prescribed in Sec. 1002.6 _____	1 hr.
	<i>Ceiling Protection</i> – ½ in. sanded gypsum plaster (mix 1:2) applied on 3/8 in. perforated gypsum lath (see Sec. 1002.5) which shall be nailed to joists in the manner prescribed in Sec. 1002.5. Joints of gypsum lath shall be covered with 3 in. strips of metal lath attached with 1¾ in., No. 12 gage nails having ½ in. heads, spaced not over 5 in. apart along joists, and 2 nails per joist for strips running perpendicular to the joists _____	1 hr.
	<i>Ceiling Protection</i> – ½ in. vermiculite-gypsum or perlite-gypsum plaster (mix 100 lbs. of gypsum to 2½ cu. ft. of aggregate) applied on 3/8 in. perforated gypsum lath (Sec. 1002.5) which shall be nailed to joists in the manner prescribed in Sec. 1002.5 _____	1 hr.
	<i>Ceiling Protection</i> – Two layers of ½ in. gypsum wallboard (see Sec. 1002.5) separated by 20 gage galvanized wire fabric with 1 in. hexagonal mesh. First (upper) layer of gypsum wallboard applied to bottom of joists with 5d cement-coated box nails, No. 15 gage, 1 5/8 in. long, with 7/32 in. diameter heads, at 18 in. c. to c., or equivalent. Wire fabric nailed over first layer of gypsum wallboard with 8d cement-coated box nails, No. 12½ gage, 2 3/8 in. long, with ¼ in. diameter heads, at 5 in. to 7 in. c. to c., or equivalent. Second layer of gypsum wallboard nailed with 8d cement-coated box nails, No. 12½ gage, 2 3/8 in. long, with ¼ in. diameter heads, at 5 in. to 7 in. c. to c., or equivalent _____	1 hr.
	<i>Ceiling Protection</i> – ¾ in. vermiculite-gypsum or perlite-gypsum plaster applied on metal lath which shall be attached to joists as prescribed in Sec. 1002.6 _____	1 hr.

FIRE RESISTANCE RATINGS OF FLOOR AND ROOF CONSTRUCTIONS – Continued**Ratings Based on Standard Fire Tests**

Type	Details of Construction (See Note ²¹)	Rating
Wood Joists	Wood floor consisting of 3/4 in. sub-floor and tongue and groove finish flooring with asbestos paper weighing 14 lb. per 100 sq. ft. between. Ceiling of 1/2 in. 1:2 gypsum and sand plaster on 3/8 in. perforated gypsum lath attached by 1 1/8 in. nails with 3/8 in. heads and spaced 4 in. on center; 3 in. strips of expanded metal lath nailed over all joints in gypsum lathe using 1 3/4 in. nails with 1/2 in. heads spaced 5 in. on centers along joists and with 2 nails to each joist for joints perpendicular to joists. (I) _____	1 hr. comb.
	Double 7/8 in. tongue and grove wood flooring with insulating layer between. Ceiling of 1/2 in. 2:1 wood-fibered gypsum and sand plaster on 3/8 in. plain gypsum plaster base attached by 1 1/4 in. nails with 7/16 in. heads, 12 to each 16 x 48 in. lath; 3 in. strips expanded metal lath nailed over all joints in gypsum lath (Y) _____	1 hr. comb.
	Wood floor consisting of 3/4 in. subfloor and tongue and groove finish flooring with asbestos paper weighing 14 lbs. per 100 sq. ft. between. Ceiling of 1/4 in. 1:2, 1:3 gypsum and sand plaster on metal lath nailed with 1 1/2 in. No. 11 gauge barbed roofers' nails having 7/16 in. heads and spaced 6 in. on centers (I) _____	1 hr. comb.
	Wood floor consisting of 3/4 in. subfloor and tongue and groove finish flooring with asbestos paper weighing 14 lbs. per 100 sq. ft. between. Ceiling of 3/4 in. 1:2, 1:3 Portland cement and sand plaster with 3 lb. asbestos fiber added per 94 lb. bag of cement, on metal lath nailed with 1 1/2 in. No. 11 gauge barbed roofers' nails having 7/16 in. heads and spaced 6 in. on centers. (I) _____	1 hr. comb.
Heavy Timber	6 in. laminated plank floor with 1 in. finish flooring on top (EE) _____	1 hr. comb.

NOTES

1. The ratings for walls with combustible members framed into the wall, apply for members framed in not over 4 inches.
2. Thicknesses given do not include the thickness of plaster where plaster is specified.
3. See "List of Inspected Fire Protection Equipment and Materials" published annually by Underwriters' Laboratories, Inc. The use of materials listed by Underwriters' Laboratories, Inc. provides reasonable assurance that the materials conform to the standard for such materials established by the Laboratories in connection with the listing.
4. A 9 in. wall may be used for this rating if hollow spaces near combustible members are filled with resistive material for the full thickness of the wall and 4 inches or more above, below and between the combustible members.
5. Equivalent thickness is the average thickness of the solid material in the wall. It may be found by taking the total volume of a wall unit, subtracting the volume of core spaces, dividing this by the area of the face of the unit. Where walls are plastered or faced with brick the thickness of plaster or brick may be included in determining the equivalent thickness.

6. Where combustible members are framed into the wall, the wall must be of such thickness or be so constructed that the thickness of solid material between the end of each member and the opposite face of the wall, or between members set in from opposite sides, will be not less than 93% of the thickness shown in the table.

7. The ratings of load bearing hollow clay tile depend in certain cases on the number of cells and units in the wall thickness. These are shown in the table: "U" representing units and "C" the cells in the wall thickness.

8. An 8 in. tile wall may be used for this rating if hollow spaces are filled as in Note ⁴.

9. With combustible structural members framed into the wall, plaster is effective in increasing the fire resistance (over that for a similar wall or partition unplastered) only when applied on the side opposite that on which the structural members are framed in, and only with respect to fire exposure from the plastered side.

10. Ceiling to be at such a level that the beams, girders or trusses to be considered as protected by the ceiling, will be separated from the ceiling by a 2½ in. air space. Ratings are for protection only from fire beneath the ceiling.

11. Group 1 and Group 2 aggregates are defined in the "Standard Specifications for Concrete and Reinforced Concrete" of the 1940 "Joint Committee Report" as follows:

"Group 1: Blast-furnace slag, limestone, calcareous gravel, trap rock, burnt clay or shale, cinders containing not more than 25% of combustible material and not more than 5% of volatile material, and other materials meeting the requirements of these specifications and containing not more than 30% of quartz, chert, flint, and similar materials."

"Group 2: Granite, quartzite, siliceous gravel, sandstone, gneiss, cinders containing more than 25%, but not more than 40% of combustible material and not more than 5% of volatile material and other materials meeting the requirements of these specifications, and containing more than 30% of quartz, chert, flint, and similar materials."

12. Thicknesses given are of the protection around the outside of the steel column, beam, girder or truss, or cast iron column, and outside of the reinforcing steel in reinforced concrete columns, beams, girders and trusses. They do not include thickness of plaster except where the protection consists only of metal lath and plaster.

13. The fire resistance of columns varies with the area of solid material in the cross section of the column – the larger the column the greater the fire resistance, for a given thickness of protection around the structural or reinforcing steel. The column dimensions given are the outer cross sectional dimensions of the steel or cast iron columns and the outside cross sectional dimensions of reinforced concrete columns. Columns smaller than those listed may require greater thicknesses of protection for the same degree of fire resistance. For columns which are not square, the protection should correspond to that for the square column having the same or next smaller cross sectional area.

14. Gravel contained not more than 10% quartz, chert, and flint.

15. Cinders contained not over 10% unburned coal and not over 5% ash.

16. Wire ties consisted of No. 5 B. & S. gauge (0.18 in. diam.) steel wire wound spirally around the steel column on a pitch of 8 in.

17. Outside wire ties consisted of No. 12 B. & S. gauge (0.08 in diam.) steel wire tied around the outside of each course of tile at the middle.

18. Tested with covering of $\frac{3}{4}$ in. gypsum and sand plaster, on which the rating was 7 hours.
19. The aggregates used contained 60% or more of quartz, chert or granite.
20. Tested with covering of $\frac{1}{2}$ in. gypsum and sand plaster, on which the rating was 6 hours.
21. Ratings of floor and roof constructions, except as otherwise specifically indicated, are based on the assumption that no wood sleepers or other combustible members will be embedded in the specified top covering of concrete or gypsum. Such members may rest on top of the specified thickness of concrete or gypsum with additional concrete or gypsum fill between sleepers. (Ratings for steel joists and formed steel members are excepted.)
22. The thickness of concrete floor slab given is the minimum thickness over the joists. Concrete plank may be used for the top slab if joints are thoroughly grouted and the plank is at least $\frac{1}{4}$ in. thicker than the specified thickness for the top slab.
23. Metal lath of approved weight serving as form for poured top slab may be considered as reinforcement.
24. Siliceous gravel contained 100% chert and quartz.
25. These ratings apply to columns with standard ties or spirals, and to columns without spirals if designed on the basis that the protective concrete covering carries no load. If the design load is based on the gross column area and the column does not have adequate ties or spirals the actual fire resistance will be considerably lower.
26. If ratings were given in quarter hour intervals, this rating would be $1\frac{3}{4}$ hrs.
27. The two hour rating shall apply to steel beams, girders and truss constructions where a top slab of concrete or gypsum at least $2\frac{1}{4}$ inches thick is supported on the top flange of the steel member protected by a ceiling as indicated.

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- (RR) Fire Protection Through Modern Building Codes.
- (SS) National Bureau of Standards Report BMS-92 Fire Resistance Classifications of Building Construction.
- (TT) National Bureau of Standards Report TRBM-44 Fire Resistance Ratings for Walls, Partitions, and Floors.
- (UU) Steel Roof Deck Construction (Fire Resistance Ratings Dated 3/31/49 – Also National Bureau of Standards Letter Dated April 13, 1949).
- (VV) Fire Resistance Ratings for Floors (National Bureau of Standards Letter Dated December 2, 1944).

APPENDIX C

Proscenium Curtain Requirements of Chapter 41, *Uniform Building Code*,

1949 Edition

Section 4101

Proscenium curtains when required shall be made of incombustible materials constructed and mounted so as to intercept hot gases, flames and smoke, and to prevent glow from a severe fire on the stage showing on the auditorium side within a period of five minutes. The curtain shall be raised and lowered each evening at the close of the performance. The closing of the curtain from the full open position shall be effected in less than thirty seconds, but the last five feet (5') of travel shall require not less than five seconds.

Section 4102

A proscenium curtain shall be constructed and installed as specified in this Chapter. The curtain shall be made of one thickness of asbestos cloth weighing not less than three and one-quarter pounds per square yard.

The asbestos cloth used in the construction of the curtain shall have incorporated into the yarn before weaving, either monel metal, nickel, brass or other metal or alloy having not less strength than these metals at temperatures up to 1700 degrees Fahrenheit and no less resistance to corrosion at ordinary temperatures. Asbestos cloth made of long fiber blue crocidolite asbestos may be used in place of chrysotile asbestos cloth of the same weight. The wires used to reinforce the yarn shall be either single or double but the tensile strength of each wire shall be sufficient to support a load of not less than three pounds at ordinary temperatures, and the strength of two strands of yarn and one wire twisted together shall be sufficient to support six pounds. The strength of the cloth in tension when tested by the strip method shall be not less than 160 pounds per inch of width of warp and 52 pounds per inch of filling.

The asbestos fiber of yarns may contain cotton or other combustible fiber not to exceed 20 percent of the weight of the cloth shall not exceed 20 percent of the weight of the asbestos. The total carbon content of the cloth shall not exceed 10 percent of the total weight of the fiber. When required by the Building Official, a sample of the cloth of sufficient size for testing shall be submitted.

In addition to any decoration, the curtain shall be painted on both sides with a mineral paint having a silicate of soda binder, which will completely fill the cloth. Filler paint shall have not less than four parts of casein in each 10 parts of silicate of soda. This paint shall be well brushed into the cloth so that no light or smoke can come through.

Section 4103

The curtain shall be made of continuous vertical strips of asbestos cloth. The widths of cloth shall overlap at the seams not less than one inch (1") and shall be sewed with a double row of stitching of asbestos thread.

The curtain shall be wide enough to extend into steel smoke grooves on each side of the proscenium opening at least eight inches (8") and shall overlap the top and sides of the proscenium opening at least twelve inches (12").

Six-inch (6") pockets shall be sewed in the top and the bottom of the curtain to hold the pipe battens; the sides shall be hemmed at least six inches (6") deep. A two-inch pipe batten shall be placed at the top and a one and one-half in (1½") batten at the bottom. For stage openings over forty feet (40') in width the bottom batten shall be not less than two and one-half inches (2½") in diameter. The battens shall be reinforced at the joints with twelve-inch (12") sections of pipe housed and riveted.

The curtain shall be held to the steel guides in the smoke pockets with substantial roller grips riveted or bolted to the side hem, not more than eighteen inches (18") on center. Each roller grip shall be fastened to the curtain with not less than three bolts or rivets.

No. 16 U.S. gauge galvanized metal shall be bent and placed vertically along each side hem of the curtain material, so that both faces of the hem are covered not less than six inches (6"). This metal edging shall be fastened to the side hem with rivets spaced not more than six inches (6") on center.

The top of the curtain shall have a smoke stop fitted to make it as smoke-tight as practicable. The bottom of the curtain shall have a yielding pad of incombustible material not less than three inches (3") thick to form a seal against the floor.

Section 4104

Smoke grooves, which protect the sides of the curtain, shall be of structural steel shapes and plates not less than one-quarter inch (¼") thick. These grooves shall be not less than fourteen inches (14") deep and six inches (6") wide and shall be set back from the face of the arch at least six inches (6"). Grooves shall extend from the stage floor to a point three feet (3') above the top of the raised curtain, and shall be securely bolted to the proscenium wall.

Steel tracks shall be built into the smoke grooves upon which shall travel the roller curtain guides and shall be installed rigidly in place and so that roller guides will operate smoothly. Safe support and smooth operation are required with a wind load of one pound per square foot over the entire area of the curtain.

Support for the curtain shall be by means of one-quarter inch (¼") flexible steel cables for curtains over forty feet (40') or less in width, and three eighths inch (3/8") flexible steel cables for curtains over forty feet (40') in width. These cables shall be spaced not more than twelve feet (12') on centers, and the end overhang shall be not more than fifteen inches (15"). Supporting cables shall be tied to the top batten with a clove-hitch and the end secured with two iron rope clips. A substitute method of attachment will be allowed if approved by the Building Official.

The supporting cables shall pass through sheaves in the gridiron and over to the counterweight guides and shall fasten to the counterweight by all means of three-eighths-inch (3/8") turnbuckles with clove-hitches and cable clips. Turnbuckles shall be locked to prevent backing out. Weight of the curtains shall be evenly divided on the cables.

There shall be safety stay chains of a straight welded link fastened to the top curtain batten of sufficient strength to support safely the weight of the curtain. There shall be one more stay chain than the number of supporting cables and, except for the stay chains at the ends of the curtain, shall be centered between the supporting cables. Stay chains shall be securely attached to the top batten of the curtain and thence to the gridiron, if of steel construction, or shall be bolted through the proscenium wall with three-fourths-inch (¾") bolts. Safety chains shall be so adjusted that they support the curtain when it is lowered and the bottom batten is resting on the pad supported by the floor.

All cables shall be carried overhead and loft blocks fitted with ball or roller bearings of ample capacity to accommodate the weight at the speeds required. Grooves in the blocks shall be machined properly to cradle and protect the cable. All blocks supporting the proscenium curtain shall be supported on the proscenium wall by means of steel brackets of suitable size safely to carry the weight, or shall be mounted on structural steel beams.

Blocks shall be installed so that the head-block is sufficiently higher than the loft blocks to prevent cables from fouling loft block housings.

Diameters of the blocks shall be a minimum of twelve inches (12") for three-line sets and sixteen inches (16") for all other sets.

The mechanism and devices for controlling the curtain shall be of simple design and shall be positive in operation. Opening of the curtain shall be by hydraulic or electric power. For curtains where the over-balance on the curtain side does not exceed 150 pounds, manual operation may be used. In this case, manual operation will be allowable only if a method is provided which allows the curtain and counter-balance to be approximately equal under normal conditions, but which adds the required overweight on the curtain side automatically in case of an emergency.

Emergency release shall be by gravity obtained by over-balancing the curtain. The emergency control line shall be of cotton sash cord, fitted with not less than four fusible links, one on each side of the stage and two overhead in the gridiron, which when the links are fused or the sash cord burned will allow the curtain to lower itself automatically. This control line shall extend up both sides of the proscenium arch and across the gridiron, and shall be so arranged that when released it will also automatically open the stage ventilators.

On each side of the proscenium arch, at a location in plain view shall be located an easily read sign, bearing the inscription: "In case of fire, cut line to lower fire curtain," with an indicator pointing to the location of a knife for that purpose. The knives shall be attached to the wall by a chain sufficiently long to reach the release line.

For electric operation there shall be installed push buttons plainly marked: "Fire Curtain – stop: Fire Curtain – down". One set of control buttons shall be installed on each side of the proscenium opening. For hydraulic or manual operation the endless line shall be marked plainly with an arrow pointing the direction for closing.

For manual operation the operating hand line shall be not less than three-fourths inch ($\frac{3}{4}$ ") diameter manila rope secured to the top and bottom of the counterweight arbor, and shall pass under a floor block, adjustable for tension, of not less than twelve-inch (12") diameter.

The top and bottom counterweight sections of the arbor shall be of cast iron, sufficiently heavy to accommodate safely the loads. The top and bottom sections shall be connected with rods not less than three-fourths inch ($\frac{3}{4}$ ") in diameter, with one tie-plate for every four feet (4') of rod. There shall be smooth grooves on the ends of the top and bottom weights which engage the steel guides. Intermediate weights shall be of cast iron, grooved to drop into place on top of the lower carrying weight. The turnbuckles connecting the supporting cables to the top weight shall be attached to eye-bolts passing through the top weight.

Counterweight guide tracks shall be structural "T's" or angles, properly tied together and securely anchored to the proscenium wall. All joints where the counterweight travels shall be ground smooth and a liberal coating of grease shall be applied to the tracks. These guides shall extend from the gridiron a length equivalent to the length of the arbor, plus the travel of the curtain, plus five feet (5'). The specified length shall be considered as the minimum. A structural steel stop shall be provided at the bottom of the arbor.

For proscenium curtains in which the overbalance is in excess of 150 pounds, an approved adjustable checking device shall be installed to check the speed of fall during the last five feet (5') of travel and an alarm shall be installed at the center of the top of the proscenium arch, which will sound when the curtain is descending through the emergency release.

APPENDIX D

**Proscenium Curtain Requirements of Section 1201, *New Building Code*,
1949 Edition**

Section 1201

The proscenium opening shall be provided with a curtain of noncombustible material constructed on a rigid steel frame, having a lap of 2 feet at the top and 18 inches at each side, sliding at each side in a rigid steel groove, which shall have a minimum depth of 12 inches. The curtain grooves shall be securely fastened to the proscenium wall and the curtain at its lowest position shall rest on masonry at least 12 inches thick extending from the foundation to the curtain or upon a strip of linoleum, cork or rubber composition directly affixed to such masonry.

The proscenium curtain shall be so arranged and maintained that, in case of fire, it will be released automatically and instantly by an approved heat-activated device, and will descend safely and close completely the proscenium opening. It shall also be equipped with effective devices to permit prompt and immediate closing of the proscenium opening by manual means.

No part of such curtain shall be supported or fastened to combustible material.

The curtain with its mounting shall be so designed as to close the opening, prevent the passage of flame, hot gasses and smoke from a severe fire on the stage and to show no glow on the auditorium side for a period of 15 minutes.

Complete details of any proposed proscenium curtain and curtain installation, including mechanism and structural supports, shall be submitted, together with satisfactory proof that such installation meets the requirements as to strength, fire resistance and smoke-tightness when subjected to a fire test with exposing temperatures reaching not less than 1700 degrees F. at the end of 15 minutes. Approval shall be obtained before erection is started. After completion, operating tests of the curtain shall be made and approval of its functioning obtained before a public performance is staged.

Note: See Appendix J, National Building Code, 1949 Edition for additional information on proscenium curtain construction.

APPENDIX E

HISTORY of VIRGINIA PUBLIC BUILDING SAFETY REGULATIONS

Date	Event	Comments
April 12, 1949	Virginia Fire Hazards Law; adopted, Title 27, Chapter 6, art. 2, Code of Virginia	Office of Chief Fire Marshal is created within Bureau of Insurance under State Corporation Commission.
December, 1953	First printing of Virginia Fire Safety Regulations (VFSR) adopted by State Corporation Commission (Commission)	Summary of application of code: Part 1 – New. (New construction requirements) Part 2 – Existing, Building built before April, 1949. Existing public buildings are required to be retrofitted to meet VFSR. VFSR also is Virginia's fire prevention code.
May 24, 1967	VFSR amended	Articles 402.1, 403, 501 amended
September 1, 1973	Uniform Statewide Building Code (USBC) adopted by Board of Housing & Community Development (BHCD)	USBC supersedes VFSR for new construction. VFSR is still used as Virginia's fire prevention code applicable to public buildings.
January 15, 1979	VFSR amended	Articles 102, 1102 amended
1981	Virginia Fire Safety Law amended, renamed to Virginia Public Building Safety Law.	Administration of VFSR and the Office of the State Fire Marshal transferred to Department of Housing and Community Development. Law is amended to require buildings built after '73 be maintained in accordance with fire safety provisions of the USBC
July 5, 1982	VFSR amended, Title changed to Virginia Public Building Safety Regulations (VPBSR); Added Part 3.	Heading changed for Part 1 to "Buildings Constructed Between April 12, 1949 and Sep 1, 1973" Heading changed for Part 2 to "Building Constructed Before April 12, 1949" Added "Part 3 – Buildings Subject to VUSBC beginning Sep 1, 1973"
March 31, 1986	Virginia Fire Hazards Law is repealed. Virginia Statewide Fire Prevention Code Act, Title 27, Section 94-101, Code of Virginia is adopted. Creates Virginia Statewide Fire Prevention Code. (VSFPC)	VSFPC is now the fire prevention code in Virginia. VPBSR is now used only as reference of maintenance requirements for existing buildings, Included in the revised Law: §27-97 "The Fire Prevention Code shall require that buildings constructed prior to 1973 be maintained in accordance with state fire and public building regulations in effect prior to March 31, 1986."
March 1, 1988	VSFPC 1987 edition is adopted by BHCD First edition of VSFPC includes edited version of VPBSR in Addendum A.	VPBSR printing omitted and/or edited portions of the regulations without following legal procedures. This document is not officially accepted as accurate.

APPENDIX F

Previous Adoptions and Amendments of the USBC

<<<<<<TO BE INSERTED>>>>