ARTICLE VI

MEANS OF EGRESS

SECTION 600. APPLICATION

1. **New Buildings.** Buildings except dwellings hereafter erected shall be provided with exit facilities in accordance with the requirements of this article.

2. **Alterations.** No building shall hereafter be altered so as to reduce the number or capacity of exits to less than required for buildings of similar construction and occupancy hereafter erected. Exits hereafter installed shall conform to the requirements for exits in new buildings, except when such exits are installed to comply with a specific order of the Insurance Commissioner.

601. GENERAL.

1. **Kind of Exits.** Exits shall consist of interior stairways, fire towers, horizontal exits, exterior stairways, passageways or doorways, constructed and arranged as specified in this article. Exterior spiral fire escapes, tubular fire escapes and chute fire escapes may, under special provisions, be installed on certain types of buildings.

2. **Number of Occupants.**

(a) The dimensions and capactiy of exits shall be proportioned to the number of persons to be accommodated.

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

Kind or use of building	*Number of square feet of floor space allowed per person*
Dance halls, lodge rooms and places of assembly	6 to 10 square feet per person
Classrooms in schools and colleges, rooms in public buildings not otherwise provided for	25 square feet per person
Stores, markets, lodging houses, and reading rooms	25 square feet per person
Factories and workrooms	35-100 square feet per person

Offices and showrooms----------50 square feet per person

Hospitals, asylums, hotels and other residence buildings-------100 square feet per person

Warehouses and garages---------150 square feet per person

SECTION 602. NUMBER OF EXITS.

(a) **From Rooms.** Every room having an occupancy of more than seventy-five persons shall have at least two doorways, remote from each other, leading to an exit or exits.

(b) **From Floor Areas.** Every floor-area occupied by more than seventy-five persons, shall have at least two means of exit.

(c) **From Floor Areas.** Every story shall have at least one interior stairway or fire tower connected thereto. Every such story shall have at least one additional exit when it exceeds two thousand five hundred square feet in area.

(d) **From Places of Assembly.** In buildings occupied as places of assembly for seventy-five or more persons for recreation or amusement, each and every room, gallery, tier or other space, where such assembly occurs shall have direct access to separate and independent exits as follows: not less than two exits when six hundred persons or less are accommodated in such room, gallery, tier or other space; not less than three exits when more than six hundred but not more than one thousand persons are accommodated; and not less than four exits when more than one thousand persons are accommodated.

(e) **From Theatres, etc.** Exits in every theatre, opera-house, moving picture show, and other like places of public amusement, including dance halls and buildings in which boxing matches, wrestling matches and other forms of athletic contests, matches and engagements are given, held or performed, shall be so arranged and located that two-thirds of all occupants of such building (allowing six square feet of floor area for each occupant) may leave such building via either side of such building, either end of such building or either side and end of such building and shall be of sufficient number to allow a number equal to two-thirds of all occupants of such building (allowing six square feet of floor area for each occupant) traveling at the rate of fourteen persons per minute per lineal foot of exit area to leave, via either side of such building, either end of such building or either end and side of such building in from

4 to 6 minutes when building is of Fireproof Construction

3 to 4 minutes when building is of Semifireproof Construction

2 to 3 minutes when building is of Heavy Timber Construction
Ordinary Construction
Noncombustible Construction

1 to 2 minutes when building is of Unprotected Metal Construction
Wood Frame Construction

The following formula applies

$$W = \frac{2LB}{3EMS}$$

in which:

L indicates length of room

B indicates breadth of room

S indicates sq. ft. required per person

E indicates 14 persons per minute per lineal foot

M indicates number of minutes req'd for class of construction

W indicates lineal ft. of exits required for ⅔rds. of room.

Example: For 90 ft x 70 ft seating area of an auditorium of Semifireproof Construction

$$W = \frac{2LB}{3EMS} = \frac{2 \times 90 \times 70}{3 \times 14 \times 3.5 \times 6} = \frac{12{,}600}{882} = 14.29$$ lin. ft. of exit width in any ⅔ area of building.

In order that the objects of this requirement, which is primarily a safety to life requirement, will be complied with, any theatre, opera-house, auditorium, assembly hall, moving picture show, or other building in which public entertainment is shown, given, produced or performed in which special scenery is used or in which special acts or performances are given, shown, produced or performed, shall, if not properly equipped with approved proscenium wall and approved fire-curtain, for the purpose of affording safety in keeping with the objects of this requirement, be deemed a building of Ordinary Construction.

And it is further provided that in order to safeguard the public from the dangers of fire and other contingencies arising and resulting in places of this kind, to see that the provisions of this law are complied with, and save the owner or owners from unnecessary confusion and expense, plans for all theatres, opera-houses, moving picture shows, and other like places of amusement to be hereafter erected shall be submitted to and approved as to the safety of the building and the occupants in case of fire, by the Insurance Commissioner before work is begun on the bulding. This requirement is to apply also when and/or where any building now standing or part thereof is to be used as a theatre,

opera-house, moving picture show or other like place of amusement.

(f). **Fire Towers Required.** In buildings exceeding sixty feet in height except office buildings of light occupancy at least one stairway shall be a fire tower; provided that in sprinklered buildings in which two or more stairways conforming to the requirements of this chapter are provided, such fire tower shall not be required unless the building exceeds one hundred feet in height.

SECTION 603. LOCATION.

(a) **Distance of Exits.** Exits 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 exit, measured along the line of travel; except that when a floor-area is subdivided into smaller areas, such as rooms in hotels and office buildings, the distance from the door of any room, along an unobstructed hallway, to an exit, shall be not more than one hundred and twenty-five feet. Hallways above the first story shall not extend beyond an exit as a dead end more than 50 feet except where the building is of fireproof construction, or semifireproof construction, or the building is sprinklered, the above distances may be increased by 50 per cent. (See Section 612(b) 1, and Section 613 for special occupancy.)

(b) **Remoteness.** Where separate exits are required for a floor-area, they shall be placed as remote from each other as practicable.

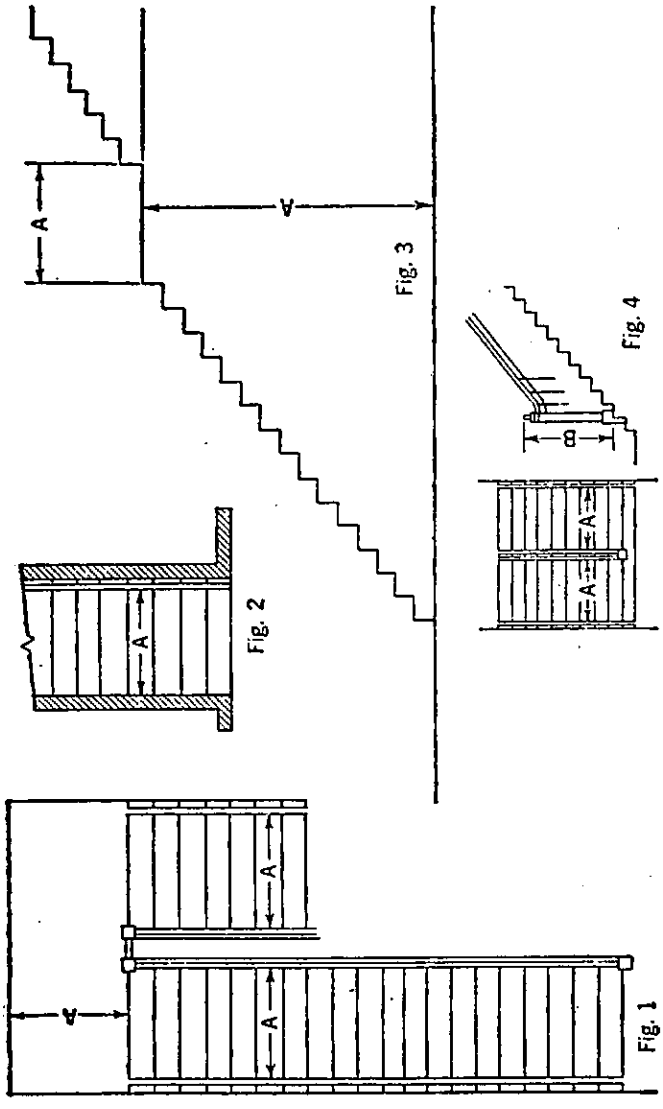
(c) **Uniform Distribution.** Where more than two exits are required, they shall be distributed as uniformly as practicable within or around the floor-area, room or space they are to serve, to effect a rapid discharge of occupants.

(d) **Outlets.**

1. Every required stairway, except in dwellings, shall lead either directly or through a passageway or hallway, to a street, or to an open space that communicates with a street.

2. In buildings more than two stories high above grade with roofs having a pitch of not more than one in four, at least one required stairway shall continue to the roof.

3. In buildings more than three stories high above grade, when there are two or more required stairways, at least two shall continue to the roof; provided that in case of roofs having a pitch exceeding one in four, such stairways shall be connected by a communicating hallway in the top story.



STAIRWAYS

Fig. 1. Dimension A is the clear width between handrails on two sides, sections 604-5a and 8c; and the width of landing, sections 604-7b and 5a.
Fig. 2. Dimension A is the clear width with handrail on one side, sections 604-5a and 8b.
Fig. 3. Dimension A is the height between floors or landings, sections 604-7a; and the width of landing, sections 604-7b and 5a.
Fig. 4. Dimension A is the clear width between side and intermediate handrails, sections 604-5a and 8d. Dimension B is the overall height of newel post or standard, section 604-8d.

SECTION 604. INTERIOR STAIRWAYS.

1. Construction and arrangement of interior stairways.

(a). Required interior stairways shall be constructed of noncombustible materials throughout, except in buildings of wood frame construction, and in buildings of ordinary construction not exceeding 30 feet to the floor of the topmost story and occupied by not more than 75 persons above, or 40 persons below, the

first story above grade. All stairways shall have solid risers securely fastened in place.

(b). When treads or landings are of slate, marble, stone or composition, they shall be substantially supported for their entire length and width.

(c). Treads and landings shall be constructed in a manner to prevent persons from slipping thereon.

(d). Every required stairway shall lead, either directly or through an exit hallway, to a street, or to an open space that communicates with a street.

(e). 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.

2. **Enclosures.**

(a). All interior stairways in buildings connecting two or more stories, whether required as exits or not, shall be enclosed, except as otherwise provided in paragraph (d).

(b). In unsprinklered buildings which exceed 30 feet to the floor of the topmost story, or are occupied by more than 75 persons above, or 40 persons below, the first story above grade, not counting those in the first story, and in multifamily houses 4 stores or more in height, interior required stairways shall be enclosed with fire partitions.

(c). In other buildings interior stairways shall be enclosed in partitions having a fire resistance rating of not less than one hour. In buildings of fireproof construction and semifireproof construction such partitions shall be noncombustible.

(d). An enclosure shall not be required for:

(1) A flight of stairs from the main entrance floor to the floor next above when such stairs are not a part of a required stairway.

(2) A flight of stairs in a building of fireproof construction, semifireproof construction, or a sprinklered building of heavy timber construction or ordinary construction or noncombustible construction, when such stairs connect only one story with one other story immediately above or below it. In such case the upper end of the stairway shall not connect to a hallway serving as an exit except through a fire door.

(3) A flight of stairs from a balcony or mezzanine having an area not exceeding 25 per cent of that of the floor immediately below.

(e). Openings. No openings except the necessary doorways, and windows opening to the exterior of the building, shall be per-

mitted in a stair enclosure required by this section. 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 stair enclosures may have wired glass panels; the area of such glass in any one door shall not exceed 720 square inches.

3. **Basement stairs.** Basement stairways located under stairways from upper stories shall be completely enclosed by construction with a fire resistance rating equal to the required enclosure above the basement and in no case less than one hour.

4. **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 stairways, 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 stairways, need not be enclosed as required for enclosure of interior stairways, if enclosed at the upper floor landings by a noncombustible enclosure equipped with an approved double acting self-closing door or doors of metal and wired glass. Wired glass in metal framework may be used for the enclosure provided no light 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 moving stairway to permit the full opening of the door or doors beyond the hand rail and having a width not less than that of the floor opening.

(c). Openings for each moving stairway not protected as above shall be protected against the passage of fire, smoke, and gases to the floor above by the "Sprinkler-Vent Method", "Rolling Shutter Method" or "Spray Nozzle Method" required by Section 43 of the Building Exists Code of the National Fire Protection Association, Fourteenth Edition, 1957.

5. **Width.**

(a). The minimum unobstructed width of a stairway serving as a required exit shall be not less than 44 inches; provided that in multifamily houses and storage buildings, and in other buildings occupied by a single tenant and limited in occupancy to 40 persons, such width may be 36 inches. The width of stairs shall be measured between hand rails except where hand rails project not more than 3½ inches into such width.

(b). 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 one-half unit may be made for 12 inches of stairs width added to one or more 22-inch units of stair width.

(c). The aggregate width of exit stairways serving any story shall be based on the number of occupants of that story as determined by section 601-2, in accordance with the following table:

	No. of Persons Per Unit of Exit Width
Public	60
Institutional	30
Residence	30
Business	60
Storage	60

The population of a mezzanine floor discharging through a floor below shall be added to the population of such floor. A stairway may be used as a required exit from all floors which it serves.

(d). When the building is sprinklered, the required aggregate exit capacity may be reduced by ⅓.

6. **Treads and risers.**

(a). Treads and risers of required stairs shall be so proportioned that the product of the width of tread, exclusive of nosing, and the height of riser, in inches, shall be not less than 70 nor more than 75; but risers shall not exceed 7¾ inches in height, and treads, exclusive of nosing, shall be not less than 9½ inches wide; except that in schools the proportion and dimensions of the treads and risers may, in the discretion of the building inspector, be adjusted to suit the age of the pupils for which the school is intended. Treads and risers shall be of uniform width and height in any one story.

(b). The use of winders is prohibited in required stairways.

7. **Landings.**

(a). No flight of stairs shall have a vertical rise of more than 12 feet between floors or landings; except that in stairways serving as exits in public buildings such vertical rise shall not exceed 8 feet.

(b). The length and width of landings shall be not less than the width of stairways in which they occur.

8. **Handrails.**

(a). Except for steps in aisles, stairs 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, continuous between landings,

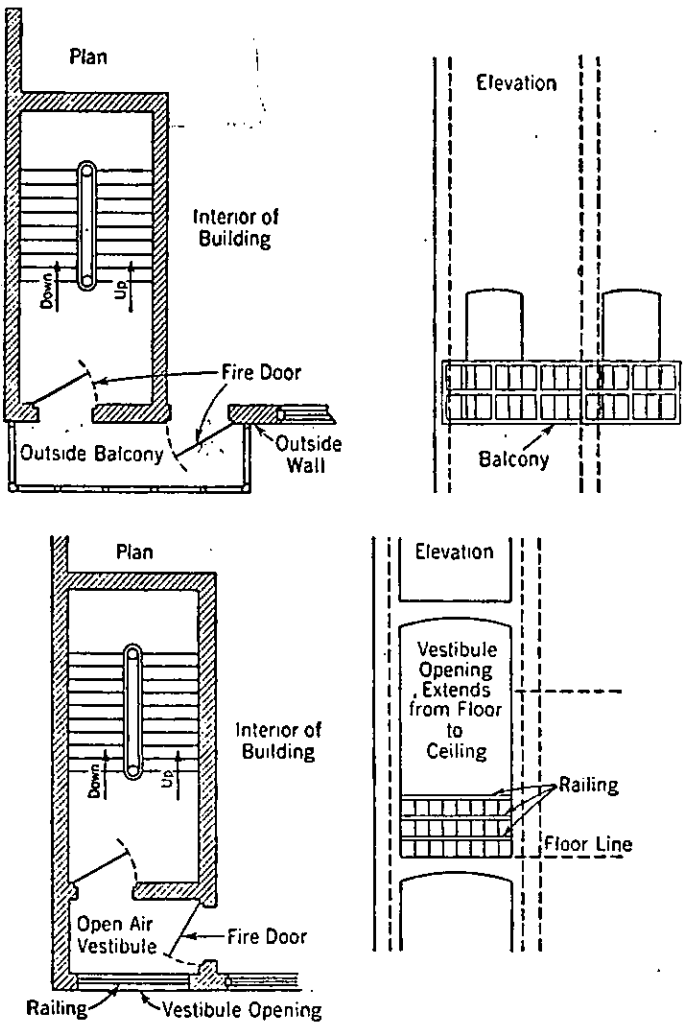


Fig. 5
Typical arrangements for fire towers. No direct communication with building. Section 605.

securely supported and terminating at the upper end in newels or standards at least 6 feet high, with no projections, shall be provided.

9. **Space under stairs.** The space under stairs built in whole or in part of combustible materials shall be left entirely open and kept clear and free from encumbrances.

SECTION 605. FIRE TOWERS.

(a). Except as specified below, fire towers, when installed, shall conform to the requirements for interior stairways in section 604.

(b). The enclosing walls shall be of approved masonry or reinforced concrete or materials having fire resistance rating of not less than two hours, and there shall be no openings in such walls, except for the necessary doors or windows. The fire tower shall have a roof of non-combustible construction of not less than two hours fire resistance rating.

(c). Access to the stairway at each story served by a fire tower shall be by vestibules or outside balconies having floors of non-combustible materials and provided with substantial railings at least 4 feet high, without any openings greater than 8 inches in width. 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 be not less than that required for 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 such bacony or vestibule. The court shall lead either directly or through an exit hallway to a street, or to an open space that communicates with a street.

SECTION 606. HORIZONTAL EXITS.

1. **General.** Horizontal exits shall consist of vestibules, open air balconies, bridges, or doorways through or around firewalls or fire partitions, connecting two floor areas. In buildings of other than fireproof or semifireproof construction, such fire partitions shall be continuous throughout all stories from the foundation to the roof.

2. **Connecting floor areas.** The floor area on either side of a horizontal exit shall be sufficient to hold the occupants of both floor areas, allowing not less than 3 square feet of clear floor space per person.

3. **Stairways.** On each side of a horizontal exit there shall be at least one interior stairway or fire tower conforming to the requirements of this article, adequate for the number of occupants on that side of such horizontal exit served by the stairway.

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, section 605.

5. **Bridges.** When bridges are used they shall be constructed of noncombustible material. The clear width of such bridges shall be no less than required for exit hallways.

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.

7. **Gradients.** Where there is a difference in level between the connected floor areas, gradients of not more than 1 foot in 10 feet shall be provided. No stairs or steps shall be used in a horizontal exit.

SECTION 607. EXTERIOR STAIRWAYS.

1. **General.** Exterior stairways shall be constructed of noncombustible materials. Exterior stairways shall conform to the requirements for interior stairways in section 604, except that enclosures shall not be required and risers may be open for a height of one inch or less at the bottom.

2. **Access.** Each story served by an exterior stairway shall have access to the stairway direct through an exit doorway.

3. **Openings protected.** All doors and windows opening on or within 10 feet of such stairs or stairways shall be protected by approved self-closing fire doors or approved fire windows.

4. **Guards.** Unless otherwise enclosed, 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 such stairs or stairways.

5. **Enclosures.** If exterior stairways are enclosed on any side, such enclosures shall be of noncombustible materials.

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

7. **Strength.** Such 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.

8. **Details.** All balcony floors and treads and risers of stairs shall be solid except that perforations not exceeding ½ inch in diameter may be used for purposes of drainage. All stairways shall be built permanently to the ground.

SECTION 608. RAMPS.

Ramps used in place of stairways shall be constructed and enclosed as required for the stairways displaced. Ramps used as exits shall have a slope not to exceed 1 foot in 10 feet and shall be provided with non-slip surfaces.

SECTION 609. EXIT HALLWAYS.

(a). The clear width of every hallway or passage leading to a required exit shall be not less than at the rate of 12 inches for every 100 persons to be accommodated by the hallway but not less than 44 inches; provided that in multifamily houses or in case less than 40 persons are to be accommodated, the minimum clear width may be 36 inches. The minimum clear width of every hallway or passage leading to a required exit in schools and hospitals or in case more than one hundred (100) people are to be accommodated shall be not less than five (5) feet.

(b). The hallway or corridor connecting a stairway with the exit doors leading to the street, or to a court or open space communicating with a street, shall have a clear width of not less than the aggregate required widths of stairways served thereby.

(c). The enclosing walls, floors and ceiling of exit hallways connecting a required 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 semifireproof construction the enclosing walls may have panels of wired glass in metal frames.

SECTION 610. DOORWAYS.

1. **Width.** The aggregate clear width of doorways serving as a required exit shall be not less than at the rate of 22 inches for every 100 persons to be accommodated. No exit doorway serving as an exit for more than 40 persons shall have a clear width of less than 34 inches (nominal 36-inch door.)

2. **Hanging of doors.**

(a). The doors of required 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 means of exit.

(b). Doorways opening on to a street or to a court or open space communicating with a street, and serving as a required exit way for more than 40 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 business buildings and storage buildings.

(c). All exit doors in rooms occupied by 40 or more persons and all exit doors in exit ways from places of assembly shall be hung to swing open in the direction of exit travel. In school and college classrooms occupied by 40 to 75 students, the doors may swing in provided two exit doors are installed.

(d). No exit door shall open immediately on a flight of stairs, but a landing the length and width of which are not less than the width of such door, shall be provided between such door and such stairs.

(e). Where the size of the exit doorway requires two doors in the same opening, the doors shall be so hung as to require no center post in the opening for the doors to close against.

3. **Revolving doors.**

(a). Revolving doors, to be acceptable as exit doors, 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 the 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; in exit ways from places of assembly only the width of one wing shall be considered in figuring exit requirements.

(b). Revolving doors shall not be used as exit doors in theatres or institutional buildings, nor shall they be used as exit doors in buildings occupied as stores where more than 75 persons are likely to be congregated, unless there are also exit doors of the swinging type, having an aggregate width of at least 50 per cent of required width of exit doors and there is at least one swinging door adjacent to each revolving door.

(c). Revolving doors shall not be used in required exit ways 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 construction.

(2) Where the place of assembly and the remainder of the building are protected by an automatic sprinkler system.

(3) Where the place of assembly has a capacity of not over 200 persons and has an exit door 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 doors of the place of assembly and the revolving doors, and there is an exit door 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 exit ways only at points of egress from the first story above grade.

(e). All revolving doors in exit ways from places of assembly shall be of an approved type which will collapse under pressure.

4. Panic Hardware. (a). The exit doors in places of assembly with a capacity in excess of 500 persons, shall be equipped with approved panic release devices. These must include devices so arranged that operation of one door equipped with a panic release device, releases the other door of a pair of doors.

(b). Fastenings on required exit doors shall be such that the door may be readily opened from the inside without the use of keys; provided that this requirement shall not apply to the doors of rooms where persons are under legal restraint, nor to doors of rooms or floor areas while such rooms or floor areas are not occupied by any persons.

SECTION 611. MAINTENANCE.

1. Physical condition. All required exit ways shall at all times be maintained in good, safe, usable condition, and shall at all times be kept free and clear of obstructions and readily accessible.

2. Exit Signs.

(a). In rooms accommodating more than 100 persons, required 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 exits are not visible from all locations in public corridors, directional signs, as required by the city building in-

spector, shall be placed on walls or otherwise displayed in conspicuous locations to direct occupants to exits.

3. **Lighting.**

(a). Required stairways, hallways, and other means of exit, including exterior open spaces to or through which exits lead, shall be kept adequately lighted at all times that the building served thereby is occupied.

(b). Artificial lighting shall be provided whenever natural lighting is indequate.

(c). In places of assembly the ligthting shall be such during occupancy that the light intensity at every point thirty inches above the floor is not less than 5 foot-candles except during a performance requiring dimming or darkness; provided that 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 be not less than 1/20 of a foot-candle.

(d). Lights required to comply with the provisions of this section and lights in public buildings 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 public buildings and institutional buildings the artificial lighting required by this subdivision shall be by electricity so arranged and supplied that the interruption of service on any circuit inside the building will not result in total interruption of the required lighting.

4. **Occupancy prohibited.** No part of a stairway, whether interior or exterior, nor of a fire tower, nor of a hallway, corridor, vestibule, balcony, or bridge, serving as an exit way, shall be used for any purpose which will interfere with its value as an exit way.

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 and guarded by a substantial metal screen for a height of not less than 6 feet.

6. **Safes and other heavy objects.** No safe or other concentrated load shall be placed on a stair landing or in a stair hall, nor shall its weight be carried by a beam which also carries the floor of such landing or stair hall.

SECTION 612. MODIFICATION OF EXIT REQUIREMENTS.

(a) **Auditoriums and Assembly Rooms.** In churches, Sunday schools and in assembly rooms not generally thrown open to the

public and which do not contain more than two hundred seats or twelve hundred square feet of seat area, the Insurance Commissioner may allow exit and aisle areas less than prescribed in this article when he deems it advisable.

When a theatre, moving picture show, auditorium or assembly room is a part of a building, the type of construction governing the exit and aisle areas shall be based on the type of walls surrounding the same and the formula used shall be for the type wall least fire resistive. Example: If a theatre is a part of a building of ordinary construction and separated from the remainder of the building by a frame wall, then the exit and aisle area in such theatre shall be the same as required for a frame building. The same to apply in moving picture shows, auditoriums, and assembly rooms.

(b) Special Exit Requirements for School Buildings and Sunday School Buildings.

1. All school buildings and Sunday School buildings over one story in height shall have two means of egress so located with reference to rooms that in case of fire on one stairway, the other stairway can be reached by the occupant without his or her having to pass the stairway involved. In fireproof and semifireproof construction the maximum dead end distance of any corridor may be 25 feet, if in the opinion of the Insurance Commissioner life safety is not endangered thereby.

2. All school buildings over one story in height, except those of Fireproof or Semi-fireproof construction, hereafter erected shall have the stairways and exits so constructed, arranged and located as to form, without the use of automatic or self-operating devices, a positive barrier to the rapid spread of heat, smoke and/or flame. All stairways in school buildings over one story in height of fireproof or semifireproof construction shall be enclosed with noncombustible partition having a fire resistance of not less than one hour.

3. Exits for auditoriums and gymnasiums in school buildings shall, unless it is established to the satisfaction of the Insurance Commissioner that such auditorium or gymnasium will not be used for entertainment purposes, be of the same size and number as that required for theatres.

(c) **Churches.** Same as theatres except with the approval of the Insurance Commissioner the exit and aisles may be reduced one fourth or more if he deems it advisable.

(d) **Schools and Sunday Schools.** Note: Auditorium areas in such buildings must comply with requirements for auditoriums and assembly rooms. Plans for all school buildings of all types of construction and plans for Sunday school buildings, except

those of not more than one story and accommodating not more than fifty children and teachers, shall be submitted to and approved by the Insurance Commissioner before work of any kind is begun on such building.

SECTION 613. SPECIAL REQUIREMENTS FOR LOCATION OF EXITS OF HOTELS, HOSPITALS, DORMITORIES, APARTMENTS, FLATS AND OTHER BUILDINGS IN WHICH ROOMS ARE RENTED FOR LIVING AND SLEEPING PURPOSES.

(a) All hotels, lodging houses, school dormitories, hospitals, sanatoriums, apartment houses, flats, tenement houses and all other buildings in which rooms are to be rented or leased or let or offered for rent, let or leased for living or sleeping purposes, hereafter constructed in this State shall be constructed so that the occupants of all rooms above the first floor shall have unobstructed access to two separate and distinct ways of egress extending from the uppermost floor to the ground, such ways of egress to be so arranged in reference to rooms that in case of fire on one stairway the other stairway can be reached by the occupant without his or her having to pass the stairway involved. Entrance to all such ways of egress aforementioned in this section shall be from corridors or hallways of not less than five feet in width, and in no case shall entrance to such ways of egress be through a room or closet, and where such building is, in the opinion of the Insurance Commissioner, of sufficient size to require more than two ways of egress, the standard established by this code shall be adhered to.

(b) Every hotel, lodging house, school dormitory, hospital, sanatorium, apartment house, flat, tenement house or other building in which rooms are rented, leased, let or offered for rent, leased or let for living or sleeping purposes, shall be provided with such additional ways of egress as the Insurance Commissioner shall deem practicable in order that the objects of this code may be accomplished and that existing dangers shall not be perpetuated.

(c) In fireproof and semi-fireproof construction the maximum dead end distance of any corridor may be 25 feet, if in the opinion of the Insurance Commissioner life safety is not endangered thereby.

ARTICLE VII.

REQUIREMENTS FOR TYPES OF CONSTRUCTION

SECTION 700. COMPLIANCE.

A building or structure need not comply with all of the provisions for a given type of construction so long as it complies with every requirement of this code affecting a building or structure for the intended occupancy, height, area, and location.

SECTION 701. FIREPROOF CONSTRUCTION.

1. General.

(a). All structural members shall be of approved noncombustible construction.

(b). No pipes, wires, cables or other service equipment shall be embedded in the required fireproofing of columns or other structural members.

2. Walls:

(a). Exterior walls and wall panels shall have a fire resistance rating of not less than 4 hours, except that panel walls may have fire resistive rating as specified in table 700 when located more than ten feet from line.

(b). All bearing walls shall be constructed of masonry or of reinforced concrete.

(c). Lintels over openings in walls shall be protected as required for beams; provided that when the span does not exceed 4 feet or such opening is spanned by an adequate masonry arch or fireproofed beam above the lintel the fireproofing may be omitted. Stone lintels shall not be used in fireproof construction unless supplemented with iron or steel lintels, capable of taking the full load, or with suitable masonry arches.

3. Columns.

(a). Columns shall have a fire resistance rating of not less than 4 hours. All spaces between the required fireproofing and the member protected shall be firestopped at each floor level.

(b). Where the fireproofing of columns is exposed to damage from trucking or handling of merchandise, it shall be jacketed for a height of 5 feet from the floor with a substantial covering, or provided with wheel guards.

4. Floors and roofs.

(a). Floor and roof constructions shall have a fire resistance rating of not less than 3 hours.

TABLE 700. FIRE PROTECTION REQUIREMENTS

DESCRIPTION	FIRE-PROOF	SEMI-FIREPROOF	NON-COMB. 2 (M) (N)	NON-COMB. 1 (M) (N)	HEAVY TIMBER (M)	ORDINARY (M)	WOOD FRAME (M) (O)	UNPROTECTED METAL (M) (O)
Structural Parts	Non-comb.	Non-comb.	Non-comb.	Non-comb.	Wood	Wood	Wood	Non-comb.
Floors—Slabs, Beams	3	2	(I)	1 (I)	None Sec. 703	None (H) (I)	None (H) (I)	None (H) (I)
Roofs—Slabs, Beams, Girders	3	2	None (I)	1 (I)	None Sec. 703	None	None	None
Roofs—High Above Floor	3	2 (E)	None	1 (E)	2" None Sec. 703	None	None	None
Columns—Supporting Floors	4	3	None (I)	2 (I)	8"x8" or 1—HR (I)	None (I)	None (I)	None (I)
Columns—Supporting Roof Only	3	2	None	1	8"x8" or 1—HR	None	None	None
Girders—Supporting 1 Floor Only	4	3	None (I)	1	6"x10" or 1—HR	None (I)	None (I)	None (I)
Girders—Supporting More than 1 Floor	4	3	None (I)	2	6"x10" or 1—HR (I)	(I)	None (I)	None (I)
Trusses—Supporting Roof Only	3	2 (E)	None	1 (E)	4"x4" or 1—HR (C)	None	None	None
Trusses—Supporting 1 floor only	3	2	None (I)	1	6"x6" or 1—HR	None (I)	None (I)	None (I)
Trusses—Supporting more Than One Floor	4	3	None (I)	2	6"x6" or 1—HR (I)	None (I)	None (I)	None (I)
Ext. Walls—Load Bearing	4	4	2 N. C. (J)	4 (J)	4 N. C. (J)	3 N.C. (J) Sec. 704-2	None Sec. 706-2	None Sec. 706-2

Panel Walls (With distance of *horizontal separation** from other buildings or property lines in feet)								
0—10**	3	3	2	3	3	3	2	2
10—20**	2	2	2 (J)	2 (J)	2 (J)	2(J)	2	2
20—30***	1 (K (L)	1 (K) (L)	1 (J) (L)	1 (J) (L)	1 (J) (L)	1(J)(L)	1	1
Over 30	NC (K) (L)	NC (K) (L)	NC (K) (L)	NC (K) (L)	NC (K) (L)	NC (K)(L)	None	NC
Party Walls	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
Fire Walls	(A)	(A)	(A)	(A)	(A) (B)	(A) (B)	(A) (B)	(A) (B)
Penthouses	(F)	(F)	(F)	(F)	(F)	(F)	None	None
Partitions—Load Bearing	3 N. C. (I)	2 N.C. (I)	N. C. (G) (I)	N. C. (G) 2 (I)	3 (I)	(I)	(I)	(I)
Partitions—Non-Bearing	N. C. 1 (G)	1 (G)	(G)	1 (G)	(G)	(G)	(G)	(G)

Numerals refer to fire resistive rating of structural parts in hours as established by Standard Fire Test. (See Article XXI Fire Resistance Ratings).

Panel Walls are non-load-bearing exterior walls supported at every floor level. For reference note (A) (B) (C), etc. See following notes.

**Horizontal Separation* means a permanent open space between the building wall under consideration and the nearest line to which a building is or may be legally built. One-half of the street width shall be used in determining the distance of horizontal separation for walls facing on a street and one-half of the narrowest space between two buildings on the same lot shall be used in determining the distance of horizontal separation between walls of buildings on the same lot. (See Note "K" below applying to panel walls when no fire resistance rating is required).

**The total area of windows in such portion of an exterior wall shall not exceed 40% of the total wall area.

***The total area of windows in such portion of an exterior wall shall not exceed 60% of the total wall area.

REFERENCE NOTES FOR TABLE 700

Notes (A), (B), (C), etc., refer to the corresponding designations in table 700 and modify the requirements of that table as indicated.

Supplementary fire protection requirements related to the size and use of the building are given in tables 403 and 404; special requirements for fire districts are in Sec. 401 and note (J).

"Non-comb." or "N. C." designates that the construction shall be of non-combustible material.

"None" designates that no fire protection is required.

(A) For fire walls and party walls, see Sec. 909.

(B) For height wall extends above roof, see Sections 909-6 and 923.

(C) For panel wall used as fire wall, see Sec. 909-5.

(D) The distance "from line" refers to the distance of the wall from the line which it faces; the distance from the opposite building line on a street, or from common property line, or from interior lot line or from an existing building on the same lot.

(E) For omission of fire protection of trusses, see Section 702-6.

(F) For Penthouses and roof structures, see Section 921.

(G) For partitions enclosing vertical openings, see Section 921.
For enclosures and protection of elevators and moving stairways, see Section 604.
For partitions enclosing exit ways see Section 609.
For separation of mixed occupancies, see Section 300-2.
For construction of Non-load bearing partitions, see Section 924.
For fire partitions, see Section 918.
For basement partitions, see Section 925.

(H) For fire retardent ceilings of basements, see Section 926.

(I) In buildings over 1-story in height, structural members which support masonry walls shall have same fire protection rating as wall.

(J) Inside the fire district, all exterior walls, except walls facing street of 30 feet or more in width shall be constructed of solid masonry not less than 12 inches in thickness and in conformance with section 907.

(K) Only streets legally dedicated to public use shall be deemed a permanent open space for buildings inside the Fire District. For buildings outside the Fire District, a permanent open space must be a street dedicated to public use or, in the case of schools, colleges and other buildings where 50 feet of actual distance between buildings is permanently maintained, the space between buildings may be deemed permanent open space at the discretion of the authority having jurisdiction.

(L) See Section 920.1 for protection of openings in exterior walls and Section 920.3 for required vertical separation between openings in exterior walls.

(M) See Section 402 for Special Occupancy Requirements.

(N) Non-Combustible number 1 construction is protected (1 hour) and number 2 has no protection on structural parts but both are constructed with structural members as per Section 705.

(O) Wood frame and unprotected metal construction not permitted inside fire district. (See Section 401).

5. **Beams and girders.**

(a). Beams and girders supporting masonry or reinforced concrete walls shall have a fire resistance rating of not less than 4 hours. Other beams and girders shall have a fire resistance rating of not less than 3 hours.

(b). Beams or other steel members supporting or constituting parts of floors or roofs, shall be securely connected to one another and to girders or columns.

6. **Trusses.**

(a). Trusses shall be of noncombustible construction.

(b). Trusses supporting columns or masonry or reinforced concrete walls shall be individually protected by noncombustible construction having a fire resistance rating of not less than 4 hours. Other trusses shall be protected by noncombustible construction having a fire resistance rating of not less than 3 hours; except that trusses which support only roof loads and ceilings over floor areas having a clear height not less than 25 feet below the lower chords of the trusses, may be protected by a ceiling of noncombustible construction having a fire resistance rating of not less than 1 hour; such ceiling shall have no openings except openings into shafts or ducts, the enclosing walls of which are of construction equivalent to the ceiling.

7. **Partitions.**

(a). Only noncombustible construction shall be used for corridor partitions, for partitions enclosing toilet rooms and other service compartments and for partitions separating the spaces occupied by separate tenants; but this shall not prohibit the use of wooden doors, door casings, frames, jambs and bucks, window and transom frames and casings unless the partitions are required to be fire partitions.

(b). Nothing in this section shall prevent the erection of temporary partitions of wood, glass or other approved material within rooms or spaces, not exceeding 5,000 square feet in area, occupied by a single tenant.

(c). All permanent partitions shall rest on noncombustible material.

8. **Flooring, trim and interior finish.**

(a). Where wooden sleepers are used for laying wooden floors, the space between the floor slab and the underside of the wooden flooring shall be filled with noncombustible material in such a manner that there will be no open spaces under the flooring which will exceed 100 square feet in area.

(b). Wooden or other combustible flooring shall be secured to the floor construction, except that flooring of wood, linoleum, rubber, tile or cork may be secured to a sub-floor of wood.

(c). Wooden trim used for door or window casings, chair rails, picture moldings and baseboards shall be backed solidly with noncombustible material.

(d). Combustible material used as wall or ceiling finish or as acoustical covering shall not exceed one inch in thickness except for projecting decorative moldings, and the total area of such material in any room or space shall not exceed 5,000 square feet, unless the material so used is an approved material of low fire hazard. Any material which has a flame spread classification of 50 or less according to the method for the "Fire Hazard Classification of Building Materials" of Underwriters' Laboratories, Inc., or which has a classification of fire retardant or better according to the test method of Federal Specification SS-A-118, shall be accepted as of low fire hazard.

(e). Supporting members for wall or ceiling finish shall be noncombustible except for furring strips applied directly against a noncombustible surface.

SECTION 702. SEMIFIREPROOF CONSTRUCTION.

1. **General.**

(a). All structural members shall be of approved noncombustible construction.

(b). No pipes, wires, cables or other service equipment shall be embedded in the required fireproofing of columns or other structural members, nor shall they be between the required fireproofing and the member protected, except in the case of members protected by a fire resisting ceiling, and columns protected by fire resistive plaster encasement of the required fire resistance rating.

2. **Walls.**

(a). Exterior walls and wall panels shall have a fire resistance rating of not less than 4 hours, except that panel walls may have fire resistive rating as specified in table 700 when located more than ten feet from line.

(b). All bearing walls shall be constructed of masonry or of reinforced concrete.

(c). Lintels over openings in walls shall have a fire resistance rating of not less than 3 hours; except that when the span does not exceed 6 feet or such opening is spanned by an adequate masonry arch or fireproofed beam above the lintel the fireproofing may be omitted.

3. **Columns.**

(a). Columns shall have a fire resistance rating of not less than 3 hours. All spaces between the required fireproofiing and the member protected shall be firestopped at each floor level.

(b). Where the fireproofing of columns is exposed to the damage of trucking or the handling of merchandise, the fireproofiing shall be jacketed for a height of 5 feet from the floor with substantial covering, or provided with wheel guards.

4. **Floors and roofs.**

(a). Floor and roof constructions shall have a fire resistance rating of not less than 2 hours.

5. **Beams and girders.**

(a). Beams and girders supporting masonry or reniforced concrete walls shall have a fire resistance rating of not less than 3 hours. Other beams and girders shall have a fire resistance rating of not less than 2 hours.

(b). Beams or other steel members supporting or constituting part of floors or roofs, shall be securely connected to one another and to girders or columns.

6. **Trusses.**

(a). Trusses shall be of noncombustible construction.

(b). Trusses supporting columns or masonry or reinforced concrete walls shall be individually protected by noncombustible construction having a fire resistance rating of not less than 3 hours. Other trusses shall be protected by noncombustible construction having a fire resistance rating of not less than 2 hours; except that trusses which support only roof loads and ceilings over floor areas having a clear height not less than 25 feet below the lower chords of the trusses, may be protected by a ceiling of noncombustible construction having a fire resistance rating of not less than 1 hour; such ceiling shall have no openings except openings into shafts or ducts, the enclosing walls of which are of construction equivalent to the ceiling.

(c). In buildings of semifireproof construction used for public occupancy, trusses supporting roof only over interior spaces having a clear height of at least twenty (20) feet below the bottom chord of the trusses, the protection of the trusses, beams and purlins may be omitted. The twenty (20) feet referred to above is measured upward from the main floor level or the highest uncontrolled usage floor.

7. **Partitions.**

(a). If combustible material enters into the construction of partitions, they shall be built to have a fire resistance rating of

not less than one hour; but this shall not prohibit the use of wooden doors, door casings, frames, jambs and bucks, window and transom frames and casings, unless the partitions are required to be fire partitions.

(b). Nothing in this section shall prevent the erection of temporary partitions of wood and glass or of metal and glass within the rooms or spaces occupied by a single tenant.

(c). All permanent partitions shall rest on noncombustible materials.

8. **Flooring, trim and interior finish.**

(a). Where wooden sleepers are used for laying wooden floors, the space between the floor slab and the underside of the wooden flooring shall be filled with noncombustible material in such a manner that there will be no open spaces under the flooring which will exceed 100 square feet in area.

(b). Wooden or other combustible flooring shall be secured to the floor construction, except that flooring of wood, linoleum, rubber, tile, or cork may be secured to a sub-floor of wood.

(c). Wooden trim used for door or window casings, chair rails, picture moldings and baseboards shall be backed solidly with noncombustible material.

(d). Combustible material used as wall or ceiling finish or as acoustical covering shall not exceed one inch in thickness except for projecting decorative moldings, and the total area of such material in any room or space shall not exceed 5,000 square feet, unless the material so used is an approved material of low fire hazard. Any material which has a flame spread classification of 50 or less according to the method for the "Fire Hazard Classification of Building Materials" of Underwriters' Laboratories, Inc., or which has a classification of fire retardant or better according to the test method of Federal Specification SS-A-118, shall be accepted as of low fire hazard.

(e). Supporting members for wall or ceiling finish shall be non-combustible except for furring strips applied directly against a noncombustible surface.

SECTION 703. HEAVY TIMBER CONSTRUCTION.

1. Walls.

(a). Exterior walls and all bearing walls shall be of masonry or of reinforced concrete or have a fire resistive rating of four hours.

(b). Exterior walls which are within 3 feet of a lot line along an adjoining area which is or may be built upon, or which are

within 6 feet of another building of other than fireproof or semi-fireproof construction on the same lot, shall have a fire resistance rating of not less than 4 hours; except that where the total area of the buildings does not exceed 1½ times the allowable area for any one of the buildings considered, such fire resistance rating shall not be required.

(c). Walls over openings shall be supported by masonry arches, or by lintels of steel or reinforced concrete. Lintels over openings more than 6 feet wide shall have a fire resistance rating of not less than 3 hours.

(d). All structural members supporting masonry or reinforced concrete walls shall have a fire resistance rating of not less than three hours.

2. **Columns.**

(a). Wooden columns shall be not less than 8 inches, nominal, in any dimension. All corners shall be rounded or chamfered.

(b). Columns shall be superimposed throughout all stories on each other, on reinforced concrete or metal post caps with brackets or be connected by properly designed steel or iron caps, pintles and base plates or by timber splice blocks affixed to the columns by means of devices or connectors housed within the contact faces.

(c). Steel and cast iron columns used in place of timber columns shall have a fire resistance rating of not less than one hour.

(d). Columns shall not rest on floor timbers; nor shall they rest on masonry foundations unless stone, cast iron or steel bases are used to transmit their loads.

3. **Beams and girders.**

(a). Beams and girders of wood shall be not less than 6 inches, nominal, in least dimension nor less than 10 inches nominal in depth. If built up of 2 or more pieces they shall be properly glued or bolted laminated pieces; precaution shall be taken to prevent decay of contact faces.

(b). Wall plates, boxes of self-releasing type or approved hangers, shall be provided where beams or girders rest on walls.

(c). Where girders and beams meet columns they shall be fitted around pintles and round columns or butted up close to rectangular columns. The adjoining ends of girders and beams shall be cross tied by approved reinforced concrete, steel or iron post caps or metal straps lag screwed or bolted to their sides or shall be intertied to and with the columns by through-bolted

corbel blocks, side bolsters, splice blocks and fillers so that the stresses are transferred by means of devices or metal connectors housed within the contacting faces of the members.

(d). Where intermediate beams are found necessary for the support of a floor, they shall rest on top of the girders; or they may be supported by approved steel or iron hangers into which the ends of beams shall be closely fitted. Interstices between beams framed together shall be filled in with a preservative compound.

(e). Steel beams, girders and trusses used in place of timber beams, girders and trusses shall have a fire resistance rating of not less than one hour.

(f). Wooden beams and girders supported by walls shall have at least 8 inches of masonry between their ends and the outside face of the wall. Where beams enter walls from opposite sides, there shall be at least 8 inches of masonry between sides of adjacent beams.

4. **Floors.**

(a). Floors shall be constructed of splined or tongued and grooved plank not less than 3 inches, nominal dimension, in thickness, covered with 1-inch tongue and grooved flooring, nominal dimension, laid crosswise or diagonally; but this shall not preclude the use of laminated floors, consisting of planks not less than 4 inches wide, nominal dimension, set on edge close together and spiked at intervals of 18 inches and covered with 1-inch, nominal dimension flooring. In laminated floors the planks shall be laid with broken joints so that no continuous line will occur across the floor. Laminated floors shall not be spiked to the supporting girders. Joints of the planking shall be over supports or at the quarter points with no more than ⅔ of the joints at such quarter points. Joints between planks shall be perfectly tight. Floors may be given a pitch of about 1 inch in 20 feet to points of discharge to relieve the floors of the weight of water from automatic sprinklers and hose, and avoid, as much as possible, water drainage to floors below.

(b). Flooring shall not extend closer than ½ inch to walls, and the space thus left shall be covered by a moulding fastened to the wall which will not obstruct an expansive movement of the floor due to wetting; or the masonry may be corbeled under the floor planks to cover this space.

(c). Floors shall have the least possible number and amount of openings, and these openings shall in all cases be protected as required for shafts (section 921) or in some other approved manner.

5. **Roofs.**

(a). Roof decks shall be of matched or splined plank not less than 2½ inches, nominal thickness, or 2 inches, nominal thickness, if the building is sprinklered, or of laminated planks not less than 3 inches, nominal width, set on edge close together and laid as required for floors; and beams and girders supporting roof loads only shall be not less than 6 inches, nominal, in least dimension. When supporting roof loads only, wood bolsters intertying adjoining girders or connecting roof trusses with columns may be used. Other forms of roof decks may be used if of noncombustible materials.

(b). Timber arches or trusses may be used to support roof loads. The framing members shall be not less than 4-inch x 6-inch, nominal dimensions, except that spaced members may be composed of 2 or more pieces not less than 3 inches, nominal, in thickness when blocked solidly throughout their intervening spaces or when such spaces are tightly closed by a continuous wood cover plate of not less than 2 inches, nominal thickness, secured to the underside of the members. Splice scabs shall be not less than 3 inches, nominal thickness. When protected by approved automatic sprinklers under the roof deck, the framing members may be reduced to not less than 3 inches nominal thickness.

6. **Roof anchorage.**

Every roof girder, and every alternate roof beam, shall be anchored to an exterior or interior wall or to an interior column; roof planking where supported by a wall shall be anchored to such wall at intervals not exceeding 20 feet; monitor and saw tooth construction shall be anchored to the main roof construction. Anchors shall consist of steel or iron bolts or straps of sufficient strength and ample anchorage to resist a vertical uplift of the roof of not less than 20 pounds per square foot of roof surface, less the weight of the roof.

7. **Power drives.** All belt or rope drives used to transmit power from one story to another, shall be located in belt towers. Such towers shall be enclosed as required for shafts (section 921). Walls having holes for shaft or belt drives shall be protected with approved self-closing fire doors.

8. **Condition of timber.** Wood used in heavy timber construction shall be installed in such manner as to prevent dry rot or rapid decay. No paint or finish of any kind shall be applied until timbers are thoroughly seasoned.

SECTION 704. ORDINARY CONSTRUCTION.

1. **Definition.** Ordinary construction, as applied to buildings, means that in which exterior walls and bearing walls are of

masonry or of reinforced concrete, and in which the structural members, including columns, floors and roof construction, are wholly or partly of wood of smaller dimensions than required for heavy timber construction, or of steel or iron not protected as required for semifireproof construction.

2. **Walls.**

(a). Exterior walls and all bearing walls shall be of masonry or of reinforced concrete or have fire resistive rating of 3 hours.

(b). Exterior walls which are within 3 feet of a lot line along an adjoining area which is or may be built upon or which are within 6 feet of another building of other than fireproof or semi-fireproof construction on the same lot, shall have a fire resistance rating of not less than 3 hours; except that where the total area of the building does not exceed 1½ times the allowable area for any one of the buildings considered such fire resistance rating shall not be required.

3. **Beams, girders and joists.**

(a). Wooden beams and joists, except headers and tail joists, and except for bearings at joints limited within the allowable stresses provided in this code, shall have bearings of at least 3 inches in length.

(b). Wooden trimmers, headers, and tail joists over 6 feet in length, unless supported on walls or girders, shall be hung in approved metal stirrups or hangers. If wood girders are set flush with the floor joists, the joists shall rest in approved metal stirrups or hangers. The ends of joists against the girders shall be securely nailed to the girders.

(c). Except in the case of pitched roofs, wooden floor and roof joists having spans in excess of 8 feet shall be rigidly braced with continuous rows of bridging at intervals not exceeding 8 feet.

(d). Joists shall be doubled under partitions which run over and parallel to the joists, or shall be designed for the load.

(e). The ends of wooden beams and joists resting on masonry shall be cut to a bevel of 3 inches in their depth.

(f). Wooden joists, beams and girders resting on opposite sides of a masonry wall shall be separated from one another by at least 6 inches of solid masonry.

(g). When a wooden girder rests on masonry an air space of ½ inch shall be provided on the sides and end of such girder for ventilation, and each wall bearing end of a girder shall be cut on a bevel.

4. **Anchorage.**

(a). All trimmers and at least one beam or joist in every six feet resting on masonry walls, shall be secured to such walls by approved metal anchors attached at or near the bottom in a manner to be self releasing. Each end of a trimmer, beam or joist that is supported by a girder, shall be secured or tied in an approved manner to such girder or to a trimmer, beam or joist correspondingly supported from the opposite side of such girder. Anchors and ties shall be so arranged as to form continuous ties between opposite masonry walls.

(b). Where floor or roof joists or beams run parallel to masonry walls such walls shall be secured to 4 or more joists of the floor or roof construction by approved metal anchors at maximum intervals of 8 feet for dwellings, and 6 feet in other buildings.

(c). Wall plates and roof construction shall be anchored to the walls at least every 6 feet.

(d). Wooden girders shall be anchored to the walls and fastened to each other with suitable steel straps placed near the bottom of the girder.

5. **Load-bearing partitions.**

(a). Load-bearing partitions shall be the equivalent of 2 x 4-inch studs, nominal dimensions, spaced not to exceed 16 inches on centers with the larger dimension perpendicular to the wall. All openings shall have studs doubled on each side and if more than 3 feet and 6 inches wide they shall be trussed over or shall have lintels of sufficient size to carry the load.

(b). Load-bearing stud partitions shall have top plates not smaller than double 2 x 4 inch, nominal dimension, and shall be set over girders or other partitions below, with the space between the ceiling and the floor above firestopped with solid 2-inch, nominal thickness plank, or with noncombustible material.

6. **Wooden columns.**

(a). Wooden columns in the several stories of a building, shall be set directly above one another, on top of the column below.

(b). The loads on wooden columns shall be transmitted to the columns below through reinforced concrete or metal caps with brackets, or through metal caps and bases with pintle connections or other approved column connections; provided that wooden bolsters may be used to support roof girders.

(c). Wooden columns shall not rest directly on floor joists.

(d). When supported by masonry, suitable stone or metal bases shall be set between the column and the masonry.

7. **Firestopping.**

(a). When the walls are furred, the space created by the furring shall be firestopped with noncombustible material at floors, ceilings and roofs. The firestopping shall be the full thickness of the furring and extend from the ceiling to the underside of the flooring or roof.

(b). When joists run parallel to the wall the space between the wall and nearest joist shall be not less than 1 inch and shall be solidly filled with masonry or approved noncombustible material.

(c). Interior stud partitions shall be firestopped at the floors and ceiling of each story by a 2-inch, nominal dimension, wood plate, the width of the stud or the equivalent.

(d). When sliding doors are pocketed in partitions, such pockets shall be completely firestopped at the top, bottom and ends, with noncombustible material or with wood not less than 2 inches in thickness, nominal dimension.

(e). Joists shall be firestopped at the ends and over supports for the full depth of the joists with noncombustible material or with wood not less than 2 inches in thickness, nominal dimension.

(f). No firestopping shall be covered or concealed until inspected by the city building inspector.

8. **Bay windows and show windows.** Bay windows and show windows that extend beyond exterior walls shall be constructed of noncombustible materials; except that show windows that do not extend above the second story floor level and bay windows on dwellings may be constructed of wood; when such bay windows of wood are more than 10 feet in width they shall be covered on the exterior surfaces with metal or other approved noncombustible, weatherproof materials.

9. **Mansard roofs.** Mansard or other slanting roofs having a pitch of more than 60° from the horizontal, hereafter placed on a building over 40 feet in height, shall be of fireproof construction or semifireproof construction.

10. **Draft stops in attic spaces.** Attic spaces shall be divided into areas of 3,000 square feet or less by tight draft stops, these shall be of 2 thicknesses of 1-inch lumber with joints broken or the equivalent, with access doors of similar construction.

SECTION 705. NONCOMBUSTIBLE CONSTRUCTION.

1. **Definition.** Noncombustible construction, as applied to buildings, means that in which all structural members, including floors, roofs and their supports, are of steel, iron, concrete, or of other noncombustible materials, having fire resistive rating as specified in Table 700 for noncombustible number 1 and 2, and

in which the exterior walls are of noncombustible construction having a fire resistance rating as specified in Table 700.

2. **Walls.** Exterior enclosure walls shall provide a durable and stable weatherproof exterior.

3. **Structural Members.** All structural members shall be of steel, iron, reinforced concrete, or of other aproved noncombustible materials.

Steel and iron for columns, girders and beams shall conform to requirements of Section 914.

4. **Partitions.** Partitions shall be constructed as required in semifireproof construction (section 702-7).

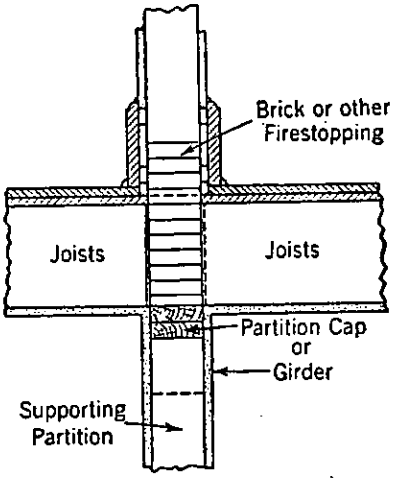


Fig. 6
Firestopping of partitions.

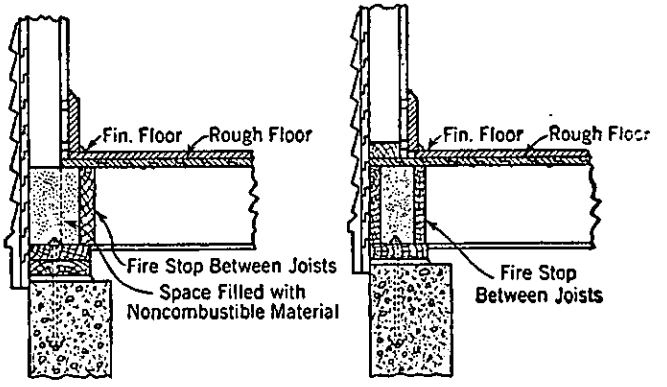


Fig. 7
Firestopping in exterior walls of frame construction at floor levels.

SECTION 706. WOOD FRAME CONSTRUCTION.

1. **Definition.** Wood frame construction, as applied to buildings, means that in which walls and interior construction are wholly or partly of wood.

2. **Walls.**

(a). Framing for exterior walls shall be constructed to develop a strength and rigidity equivalent to wooden studding, not less than 2 by 4 inches, nominal dimension, spaced 16 inches on centers with the larger dimension perpendicular to the wall, and braced with sheathing, or diagonal bracing at the corners, to secure the necessary rigidity; except that in one-story buildings studs not over 10 feet in length may be spaced not to exceed 24 inches on centers.

(b). In buildings except private garages, an exterior wall which is less than 3 feet distant from the lot line along an adjoining area which is or may be built upon shall be of noncombustible construction having a fire resistance rating of not less than two hours; except that the material of the weather surface may be similar to that of other exterior walls of the building.

(c). An exterior wall which is less than 6 feet distant from a wall of another building of wood frame construction on the same lot, shall be of noncombustible construction having a fire, resistance rating of not less than two hours; except that the material of the weather surface may be similar to that of other exterior walls of the building; and except that when the aggregate area of the two buildings does not exceed 1½ times the limiting area fixed by this code for either building, such fire resistance rating shall not be required.

3. **Stucco.**

(a). Stucco shall consist of portland cement mortar or other approved mortar, on approved metal lath, or other approved backing.

(b). Stucco shall be kept at least 8 inches above adjacent ground surfaces, with sills, coping and other projecting courses provided with drips.

(c). Corrosion-resistant flashing, to prevent moisture from penetrating behind the stucco, shall be provided over wall openings and over projecting courses.

4. **Sills.** Sills shall be anchored to the foundation walls at intervals not exceeding 6 feet by anchors equivalent to bolts not less than ½ inch in diameter with proper washers, embedded at least 6 inches in the foundation.

5. **Anchorage.**

(a). In all buildings 20 feet or more in width where joists run at right angles to the rafters, the rafters shall be tied to the ceiling joists with wood or metal ties nailed to the foot of alternate rafters and extending across 4 joists well nailed to each joist.

(b). All joists shall be well lapped and nailed across the building to form ties between outside walls.

6. **Beams, girders and joists** shall conform to the requirements of section 704-3, paragraphs (a) to (d) inclusive. Where ledger or ribbon boards are used to support joists, such boards shall be not less than 1 x 4 inch, nominal dimensions, shall be cut into the studs and securely nailed with not less than 2 tenpenny nails to each stud, and the joists shall be spiked to the studs.

7. **Load bearing partitions** shall conform to the requirements of section 704-5.

8. Wooden columns shall conform to the requirements of section 704-6.

9. **Firestopping.**

(a). Exterior walls of wood 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.

(b). Joists shall be firestopped at the ends and over supports for the full depth of the joists.

(c). Interior stud partitions shall be firestoped at the floors and ceiling of each story by a 2-inch, nominal dimension, wood plate, the width of the stud or the equivalent.

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

(e). Firestopping shall be of noncombustible material or of wood not less than 2 inches in thickness, nominal dimension. No firestopping shall be covered or concealed until inspected by the city building inspector.

10. **Draft stops in attic spaces.** Draft stops shall be provided in attic spaces as required by section 704-10.

SECTION 707. UNPROTECTED METAL CONSTRUCTION.

Unprotected metal construction, as applied to buildings, means that in which the structural supports are unprotected metal and in which floors and roofs are of noncombustible construction, and the exterior walls are of noncombustible construction having a fire resistance rating of less than 2 hours.

ARTICLE VIII.
MATERIALS AND DESIGN LOADS

SECTION 800. MATERIALS.

1. **Quality of materials.** All building materials shall be of a quality to meet the intent of this code, and shall conform to specifications, consistent with its requirements, promulgated as rules by the North Carolina Building Code Council in accordance with section G. S. 143-141. In case there is reason to doubt the quality of a materials to be used in a building or structure, the North Carolina Building Code Council may require tests to be made to establish its suitability or to determine whether it conforms to the intent of this code.

2. **Materials and construction not clearly conforming to this code.** Whoever desires to use materials or constructions whether prefabricated or otherwise, which do not clearly conform to the provisions of this code shall present to the North Carolina Building Code Council such plans, methods of analysis, test data, or other information, and shall make such additional tests or present such evidence, as the Building Code Council may require.

SECTION 801. TESTS.

1. **Conduct of tests.** Tests required by section 800 shall be conducted under the supervision of the North Carolina Building Code Council, except that duly authenticated tests by a competent person or laboratory may be accepted by them in lieu of tests under their supervision. So far as practicable test procedure shall be described in rules duly promulgated in accordance with section G. S. 143-138(c).

2. **Approvals.** Any material or method of construction meeting the requirements of this code or rules authorized thereunder shall be approved by the North Carolina Building Code Council within a reasonable time after the completion of the tests. All such approvals and the conditions under which they are issued shall be reported and kept on file, open to public inspection.

3. **Conditions attached to approvals.**

(a). Materials or methods of construction which have been tested and approved shall be used and installed in accordance with the terms of approval.

(b). So far as practicable materials for which special approvals have been issued shall have a distinctive brand mark or label for identification impressed on or otherwise attached to them. It shall be unlawful to use any such brand mark or label on any other material than that for which the approval was issued.

4. **Additional tests.** The Building Code Council may require tests to be repeated, if at any time there is reason to believe that a material no longer conforms to the requirements on which its approval was based.

5. **Tests on completed work.** In case there is reason to question the safety of a floor or other structural part of a building or structure in course of construction or before a certificate of occupancy has been issued, the City Building Inspector may require load tests or other suitable test to determine the acceptability of the construction. Such tests shall be made under the supervision of the City Building Inspector. The tests shall be made with a superimposed load equal to not less than twice the design live load, and within 24 hours after the load is removed the assembly shall recover at least three-quarters of the maximum deflection.

6. **Rejection.** Any material or method of construction failing to conform to the requirements of this code or rules adopted thereunder shall not be used.

SECTION 802. WEIGHT OF BUILDING MATERIALS.

For the purpose of estimating dead-loads, in the absence of more definite information, the weights of building materials shall be assumed to be as follows:

	Lbs. per cu. ft.
Brickwork	120
Cast stone	144
Concrete, light weight aggregate	90
Concrete, stone aggregate	144
Concrete block, hollow, stone aggregate	85
Concrete block, hollow, lightweight aggregate	65
Granite, ashlar masonry	165
Limestone, oolitic	135
Sandstone	144
Oak	45
Southern yellow pine	39
Cypress, larch, short leaf yellow pine and tamarack	32
Douglas fir, Port Orford cedar, hemlock, redwood and white pine	34
Spruce	28
Water	62.5
Steel	490

Partitions and Walls

	Lbs. per sq. ft. of wall surface
Wood studs 2 x 4, wood lath or plaster board, ⅝ in. plaster, two sides	20
Solid plaster 2 in. with metal studs and metal lath	20
Wood studs 2 x 4, metal lath and ¾ in. plaster, two sides	18
Hollow partitions of metal studs, metal lath and ¾ in. plaster, two sides	17½
Plaster on masonry or blocks	5
2 in. structural clay tile with scored face	14*
3 in. structural clay tile with scored face	17*
4 in. structural clay tile with scored face	18*
6 in. structural clay tile with scored face	28*
Gypsum tile, 2 in.	9½
Gypsum tile, 3 in.	10
Gypsum tile, 4 in.	13
Gypsum tile, 6 in. hollow	18½
4 in. glass block masonry	18

*These weights are for non-load-bearing tile. See ASTM C34-41 for weights of load-bearing wall tile.

Ceilings

	Lbs. per sq. ft. of surface
Suspended ceilings of metal lath and plaster	10

Roofing

	Lbs. per sq. ft. horizontal surface
Wood shingles	3
Asbestos shingles	4
Asphalt shingles	6
Slate, ¼-inch	10
Tar and gravel, 5 ply	6
Ready roofing	1
Copper or tin	1
Corrugated iron	2
Clay tile	10-18
Skylights, metal and wired glass	8

SECTION 803. LIVE LOADS.

1. **General.**

(a). Every building and structure shall be designed and erected of sufficient strength in all its parts to sustain safely all live loads depending thereon, whether permanent or temporary, in addition to the dead loads.

(b). Every temporary support placed in or under a building or structure shall be of sufficient strength to carry safely the load to be supported thereby.

2. **Floor loads.** No floor hereafter eretced in a building shall be designed for less than the following live loads per square foot of area uniformly distributed, according as the floor may be intended to be used for the purposes indicated:

Occupancy	*Live Load Lbs. per sq. ft.*
Public Buildings:	
Armories	150
Assembly halls, auditoriums, churches, lecture halls and lodge rooms	
Fixed seats	60
Movable seats	100
Dance halls, exhibition buildings, grandstands, gymnasiums, museums, passenger stations, recreation piers, restaurants	100
City halls, court houses, club rooms	80
School and college classrooms	40
Corridors	100
Theatres:	
Aisles, projection rooms	100
Orchestra floor	60
Balconies	60
Stage floor	150
Institutional Buildings:	
Hospitals, asylums, infirmaries, sanitariums:	
Operating rooms	60
Private rooms	40
Wards	40
Public spaces	80
Laboratories, X-Ray rooms	100
Penal institutions, reformatories, jails and houses of correction:	
Cell blocks	40
Corridors and stairways	100
Nurseries, orphanages, homes for the aged	40

Residence Buildings:	
Public rooms and corridors	100
Other areas	40
Business Buildings:	
Office Buildings:	
Corridors and public spaces	80
Other floor areas	50
Factories, work shops—light work	125
Bakeries, laundries	150
Stores, light merchandise	125
Stores, heavy merchandise	250
Storage Buildings:	
Garages	80
Open air parking garages (For automobiles only)	50
Storage warehouses, light	125
Storage warehouses, heavy	250

When occupancies or uses not listed above are involved, the live load shall be determined in a manner satisfactory to the City Building Inspector.

3. **Provision for partitions.** In office buildings or other buildings where partitions might be subject to erection or rearrangement, provision for partition weight shall be made, whether or not partitions are shown on the plans, unless the design live load exceeds 80 pounds per square foot.

4. **Concentrated floor loads.** Every floor hereafter erected in a business building or storage building shall be designated to sustain safely a concentrated load of 2,000 pounds placed upon any space 2½ feet square wherever such load upon an otherwise unloaded floor would produce stresses greater than the uniformly distributed load for which the floor is designed. Floors in garages and floors used for automotive trucking shall be designed for the maximum wheel loads.

5. **Stairway and balcony railings.** Stairway and balcony railings, both exterior and interior, shall be designed to resist a horizontal thrust of 50 pounds per lineal foot applied at the top of the railing.

6. **Roof loads, including snow loads.**

(a). Ordinary roofs, either flat or pitched, shall be designed for a load of not less than 20 pounds per square foot of horizontal projection in addition to the dead load, and in addition to either the wind or other loads.

(b). When a roof, in addition to serving as a closure of a building or structure, is to be used as a floor, it shall be designed to carry safely the live-load to be imposed but not less than the minimum live-load prescribed in this section for floors.

(c). Accessible ceilings, scuttles, and ribs of skylights shall be designed to support a concentrated load of 200 pounds occupying an area 2½ feet square and so placed as to produce maximum stresses in affected members.

7. **Sidewalk loads.** For sidewalks over vaults and areas, the live-load shall be 250 pounds per square foot uniformly distributed.

8. **Yard and court loads.** For yards and courts inside the lot lines the live-loads shall be taken at not less than 125 pounds per square foot uniformly distributed.

9. **Reduction in Live Loads.**

(a). No reduction shall be applied to the roof live load.

(b). For live loads of 100 pounds or less per square foot, the design live load on any member supporting a floor area of 150 square feet or more may be reduced at the rate of 0.08 per cent per square foot of the total floor area supported by the member, except that no reduction shall be made for areas to be occupied as places of assembly. The reduction shall exceed neither R as determined by the following formula, nor 60 per cent:

$$R = 100 \, X \frac{D+L}{4.33L}$$

in which:

R — reduction in percent
D — dead load per square foot of area supported by the member
L — design live load per square foot of area supported by the member

For live loads exceeding 100 pounds per square foot, no reduction shall be made, except that the design live loads on columns may be reduced 20 percent.

10. **Posting of live loads.** The live-load for which each floor, or part of a floor, or of a business building or a storage building hereafter erected is designed and approved shall be conspicuously posted in that part of the story to which it applies.

11. **Loading restricted.** No person shall place, or cause or permit to be placed, on any floor of a building or on any part of a structure a greater load than the approved or accepted safe load.

SECTION 804. WIND PRESSURE.

1. **When condsidered.** All building and structures, including tanks and towers shall be designed to resist a horizontal wind presure on all surfaces exposed to the wind allowing for wind in any direction, in accordance with the following table. The

height is to be measured above the average level of the ground adjacent to the building or structure.

Height Zone (Feet)	*Wind Pressure (Lbs. per Sq. Ft.)*
Less than 50	20
50-99	24
100-199	28
200 and above	30

No allowance shall be made for the shielding effect of other buildings or structures.

2. **Exterior walls.** Every exterior wall shall be designed to withstand the pressures specified above, acting either inward or outward.

3. **Roofs.**

(a). The roofs of factory buildings, armories, hangars, and other buildings with large open interior, shall be designed to withstand an external suction of not less than 25 pounds per square foot.

(b). Roofs or sections of roofs with slopes greater than 30° shall be designed to withstand pressures, acting inward normal to the surface, equal to those specified above and applied to the windward slope only.

4. **Stability.** The overturning moment due to wind pressure shall not exceed 66⅔ per cent of the moment of stability disregarding live-loads, unless the building or structure is securely anchored to the foundation to resist this force.

5. **Signs.**

(a). All signs shall be designed to withstand the horizontal pressures shown in the following table, applied to the projected exposed area, allowing for wind from any direction:

Height from Ground to Top of Sign in Feet	*Wind Pressure Pounds per Square Foot*	
	Solid Signs	*Open Signs*
Up to 30	15	25
31-50	25	35
51-99	30	42
100-199	35	49
200-299	38	53

(b). Signs in which the projected area exposed to wind consists of 70 per cent or more of the gross area as determined by the over-all dimensions shall be classed as solid signs; those in which the projected exposed area is derived from open letters, figures, stripes, and structural framing members, the aggregate total area of which is less than 70 per cent of the gross area so determined, shall be classed as open signs.