

RULE XII - GENERAL DESIGN AND CONSTRUCTION REQUIREMENTS

SECTION 1201. General Requirements

1. Buildings proposed for construction shall comply with all the regulations and specifications including safety standards embodied in the Administrative Order of **DOLE** herein set forth governing quality, characteristics and properties of materials, methods of design and construction, type of occupancy and classification.
2. The various applicable referral codes shall supplementally guide the planning, design, layout, content, construction, location/siting, installation and maintenance of all buildings/structures.
3. For the guidance of the general public, the Secretary shall periodically issue generic lists of approved, strictly regulated or banned items, procedures, usages and the like relative to the design, construction and use/occupancy of buildings/structures:
 - a. Materials for construction;
 - b. Processes for the production of materials, their installation or construction;
 - c. Procedures/methodologies/systems for both design and construction;
 - d. Organizational structures/hierarchies for construction;
 - e. Types of occupancy; and
 - f. Classifications relative to design, construction and occupancy.
4. All buildings/structures shall be placed in or upon private property or duly designated public land and shall be securely constructed in conformance with the requirements of the **Code**.

SECTION 1202. Excavation, Foundation, and Retaining Walls

1. Subject to the provisions of **Articles 684 to 686** of the **Civil Code** of the Philippines on lateral and subjacent support, the design and quality of materials used structurally in excavation, footings, and in foundations shall conform to accepted engineering practice.
2. Excavation and Fills
 - a. Excavation and fills for buildings or structures shall be so constructed or protected that they do not endanger life or property.
 - b. Whenever the depth of excavation for any construction is such that the lateral and subjacent support of the adjoining property or existing structure thereon would be affected in a manner that the stability or safety of the same is endangered, the person undertaking or causing the excavation to be undertaken shall be responsible for the expense of underpinning or extending the foundation or footings of the aforementioned property or structure.
 - c. Excavation and other similar disturbances made on public property shall, unless otherwise excluded by the **Building Official**, be restored immediately to its former condition within 48 hours from the start of such excavation and disturbances by whosoever caused such excavation or disturbance.

- d. Before undertaking excavation works, drilling or otherwise disturbing the ground, the persons doing the work, or causing such work to be done, shall contact all public utilities/services to determine the possible location of underground facilities, to avoid hazard to public safety, health and welfare caused by the inadvertent disruption of such facilities.
- e. Protection of Adjoining Property. Any person making or causing an excavation to be made below existing grade shall protect the excavation so that the soil of adjoining property will not cave-in or settle and shall defray the cost of underpinning or extending the foundation of buildings on adjoining properties. Before commencing the excavation, the person making or causing the excavation to be made shall notify in writing the owners of adjoining buildings not less than **ten** (10) days before such excavation is to be made and that the adjoining buildings will be protected by him. The owners of the adjoining properties shall be given access to the excavation for the purpose of verifying if their properties are sufficiently protected by the person making the excavation. Likewise, the person causing such excavation shall be given access to enter the adjoining property for the purpose of physical examination of such property, prior to the commencement and at reasonable periods during the progress of excavation. If the necessary consent is **not** accorded to the person making the excavation, then it shall be the duty of the person refusing such permission to protect his buildings or structure. The person causing the excavation shall **not** be responsible for damages on account of such refusal by the adjoining property owner to permit access for inspection. In case there is a party wall along a lot line of the premises where an excavation is being made, the person causing the excavation to be made shall at his own expense, preserve such party wall in as safe a condition as it was before the excavation was commenced and shall, when necessary, underpin and support the same by adequate methods.
- f. At an early stage, and before work is commenced, a careful and accurate survey of any cracks in the existing adjoining owner's premises should be made, and, where possible, photographs should be taken, recorded, and agreed between the parties concerned. Where necessary, tell-tales should be fixed to cracks with the object of showing any further movements during demolition and excavation. Tell-tales should preferably be in the form of fixed points built in on each side of the crack and should be capable of being measured by a micrometer or vernier caliper. They should be of such a nature that both horizontal and vertical movements could be recorded.
- g. Cut slopes for permanent excavations shall not be steeper than two (2) horizontal to one (1) vertical and slopes for permanent fills shall not be steeper than two (2) horizontal to one (1) vertical. Deviation from the foregoing limitations for slopes shall be permitted only upon the presentation of a geotechnical/geological investigation report acceptable to the Building Official.
- h. On a large site that is at a considerable distance from the surrounding properties and public highways, deep excavation may be carried out in the open in bulk, leaving slopes around the perimeter. It is important to ensure that no serious failures of the banks will occur to endanger those working on the site or the public. The safe angle of the cut slope shall be determined by an appropriate geotechnical/geological site investigation acceptable to the Building Official.
- i. In cases where the excavation passes through a permeable water-bearing stratum overlying an impervious bed, a bench should be formed at the junction of the strata to carry an intermediate intercepting drain.
- j. If groundwater is standing at a considerable head around the excavation, measures shall be undertaken to reduce this head by a system of weepholes at the lowest 1/3 section of the excavation wall or by enclosing the site with suitable sheet piling or if a water-sealing stratum can be reached within a reasonable distance at the bottom of the excavation.

- k. In fine sands or silts where sheet piling alone is relied upon, it will be necessary to watch the pumping very carefully because, in fine-grained materials, the removal of even a small volume of water may cause “blows” in the bottom of the excavation or may result in disturbance to adjoining structures.
 - l. Except in excavation inside sloping banks, rock, or within caissons, all excavations should be lined with shotcrete, boards, runners or sheet piles supported laterally, if necessary, by framings of wallings and struts, which may be of timber, steel, or reinforced concrete, to a sufficient extent to prevent the excavation from becoming dangerous to life or limb by movement or caving in of the adjoining soil.
 - m. All linings and framings should be inserted as the excavation proceeds, and should be tightened up against the adjoining soil by wedging or jacking and secured by cleats or other suitable means.
 - n. Every trench, 1.50 meters or deeper, shall be provided with suitable means of exit or escape at least every 7.50 meters of its length.
 - o. Where workers are employed adjacent to an excavation on work other than that directly connected with the excavation, sufficient railings or fences shall be provided to prevent such workers from falling into the excavation.
 - p. Excavations that may be left open for any length of time, periodic inspections of timbering or strutting should be made and wedges tightened as found necessary.
 - q. In long excavation for walls, it may be found expedient and safe to arrange the excavation in a series of alternate sections in order to avoid a long, continuous excavation supported only on temporary strutting. Such sections should be arranged in convenient lengths (depending on the total length to be done) and of a width sufficient to construct a unit of the retaining wall that will be adequate to afford permanent support to that portion of the ground; the wall unit should be completed before proceeding with the adjacent section of the excavation.
 - r. Where water is encountered in excavation, a sump should be maintained below the level of the excavation in order that surface and groundwater can be led into it and pumped out; provided that the inflow of water does not carry much soil in suspension and does not require continuous pumping to keep the risk of settlement of the surrounding ground.
 - s. **No fill** or other surcharge loads shall be placed adjacent to **any building**/structure unless such **building**/structure is capable of withstanding the additional loads caused by the fill or surcharge.
 - t. Existing footings or foundations which may be affected by any excavation shall be underpinned adequately, or otherwise protected against settlement, and shall be protected against lateral movement.
 - u. Fills to be used to support the foundations of **any building**/structure shall be placed in accordance with accepted engineering practice. A soil investigation report and a report of satisfactory placement of fill, shall be both acceptable to the **Building Official**.
3. Footings, Foundations, and Retaining Walls
- a. Footings and foundations shall be of the appropriate type, of adequate size, and capacity in order to safely sustain the superimposed loads under seismic or any condition of external forces that may affect the safety or stability of the structure. It shall be the responsibility of the architect and/or engineer to adopt the type and design of the same in accordance with the standards set forth by the Secretary.

- b. Whenever or wherever there exist in the site of the construction an abrupt change in the ground levels or level of the foundation such that instability of the soil could result, retaining walls shall be provided and such shall be of adequate design and type of construction as prescribed by the Secretary.

SECTION 1203. Veneer

1. Veneer is a nonstructural facing of brick, concrete, tile, metal, plastic, glass, or other similar approved materials attached to a backing or structural components of the building for the purpose of ornamentation, protection, or enclosure that may be adhered, integrated, or anchored either on the interior or exterior of the building or structure.
2. *Design Requirements.* The design of all veneer shall comply with the following:
 - a. Veneer shall support no load other than its own weight and the vertical dead load of veneer immediately above.
 - b. Surfaces to which veneer is attached shall be designed to support the additional vertical and lateral loads imposed by the veneer.
 - c. Consideration shall be given to differential movements of the supports including those caused by temperature changes, shrinkage, creep, and deflection.
 - d. Adhered veneer and its backing shall be designed to have a bond to the supporting elements sufficient to withstand shearing stresses due to their weights including seismic effects on the total assemblage.
 - e. Anchored veneer and its attachment shall be designed to resist horizontal forces equal to twice the weight of the veneer.
 - f. Anchors supports and ties shall be non-combustible and corrosion-resistant.

SECTION 1204. Enclosure of Vertical Openings

1. *General.* Vertical openings shall be enclosed depending upon the fire resistive requirements of a particular type of construction as set forth in the Code.
2. *Elevator Enclosures.* Walls and partitions enclosing elevators and escalators shall be of not less than the fire-resistive construction required under the Types of Construction. Enclosing walls of elevator shafts may consist of wire glass set in metal frames on the entrance side only. Elevator shafts extending through more than two storeys shall be equipped with an approved means of adequate ventilation to and through the main roof of the building; *Provided*, that in those buildings housing Groups F and G Occupancies equipped with automatic fire-extinguishing systems throughout, enclosures shall not be required for escalators; *Provided*, further that the top of the escalator opening at each storey shall be provided with a draft curtain. Such draft curtain shall enclose the perimeter of the unenclosed opening and shall extend from the ceiling downward at least 300 millimeters on all sides. Automatic sprinklers shall be provided around the perimeter of the opening and within a 600 millimeters of the draft curtain. The distance between the sprinkles shall not exceed 1.80 meters center-to-center.
3. *Other Vertical Openings.* All shafts, ducts, chutes, and other vertical openings not covered in paragraph above shall have enclosing walls conforming to the requirements specified under the type of construction of the building in which they are located. In other than Group A Occupancies, rubbish and linen chutes shall terminate in rooms separated from the remainder of the building by a

One-Hour Fire-Resistive Occupancy Separation. Openings into the chutes shall not be located in required exit corridors or stairways.

4. *Air Ducts.* Air ducts passing through a floor shall be enclosed in a shaft. The shaft shall be as required in this Code for vertical openings. Dampers shall be installed where ducts pierce the shaft enclosure walls. Air ducts in Group A Occupancies need not be enclosed in a shaft if conforming to the mechanical provisions of the Code.

SECTION 1205. Floor Construction

1. Floors shall be of such materials and construction as specified under Rule V - Fire Zones and Fire-Resistive Standards and under Rule IV - Types of Construction.
2. All floors shall be so framed and secured into the framework and supporting walls as to form an integral part of the whole building.
3. The types of floor construction used shall provide means to keep the beam and girders from lateral buckling.

SECTION 1206. Roof Construction and Covering

1. *Roof Covering.* Roof covering for all buildings shall be either fire-retardant or ordinary depending upon the fire-resistive requirements of the particular type of construction. The use of combustible roof insulation shall be permitted in all types of construction provided it is covered with approved roof covering applied directly thereto.
2. *Roof Trusses.* All roofs shall be so framed and tied into the framework and supporting walls so as to form an integral part of the whole building. Roof trusses shall have all joints well fitted and shall have all tension members well tightened before any load is placed in the truss. Diagonal and sway bracing shall be used to brace all roof trusses. The allowable working stresses of materials in trusses shall conform to the Code. Camber shall be provided to prevent sagging.
3. *Attics.*
 - a. *Access.* An attic access opening shall be provided in the ceiling of the top floor of buildings with a combustible ceiling or roof construction. The opening shall be located in a corridor or hallway of buildings of three (3) or more storeys in height and readily accessible in buildings of any height. An opening shall not be less than 600 millimeters square or 600 millimeters in diameter. The minimum clear headroom of 800 millimeters shall be provided above the access opening. For ladder requirements, refer to the Philippine Mechanical Engineering Code.
 - b. *Area Separation.* Enclosed attic spaces of combustible construction shall be divided into horizontal areas not exceeding 250 sq. meters by fire-resistive partitions extending from the ceiling to the roof. *Except,* that where the entire attic is equipped with approved automatic fire-extinguishing system, the attic space may be divided into areas not to exceed 750 sq. meters. Openings in the partitions shall be protected by self-closing doors.
 - c. *Draft Stops.* Regardless of the type of construction, draft stops shall be installed in trusses roofs, between roof and bottom chords or trusses, in all buildings exceeding 2000 sq. meters. Draft stops shall be constructed as for attic area separations.
 - d. *Ventilation.* Enclosed attics including rafter spaces formed where ceilings are applied direct to the underside or roof rafters shall be provided with adequate ventilation protected against the entrance of rain.

4. Roof Drainage System

- a. *Roof Drains.* Roof drains shall be installed at low points of the roof and shall be adequate in size to discharge all tributary waters.
- b. *Overflow Drains and Scuppers.* Where roof drains are required, adequate overflow drains shall be provided.
- c. *Concealed Piping.* Roof drains and overflows drains, when concealed within the construction of the building, shall be installed in accordance with the provisions of the National Plumbing Code.
- d. *Over Public Property.* Roof drainage water from a building shall not be permitted to flow over public property, except for Group A and J Occupancies.

5. Flashing. Flashing and counterflashing shall be provided at the juncture of the roof and vertical surfaces.

SECTION 1207. Stairs, Exits, and Occupant Loads

1. General. The construction of stairs and exits shall conform to the occupant load requirements of buildings, reviewing stands, bleachers, and grandstands.

- a. *Determination of Occupant Loads.* The occupant load permitted in any building or portion thereof shall be determined by dividing the floor area assigned to that use by the unit area allowed per occupant as shown on **Table XII.1.** and as determined by the Secretary.

- i. When the unit area per occupant for any particular occupancy is not provided for in **Table XII.1.**, the **Building Official** shall determine the same based on the unit area for occupancy, which it most nearly resembles.
- ii. The occupant load of any area having fixed seats shall be determined by the number of fixed seats installed. Aisles serving the fixed seats in said area shall be included in determining the occupant load.
- iii. The occupant load permitted in a building or portion thereof may be increased above that specified in **Table XIII.1.** if the necessary exits are provided.
- iv. In determining the occupant load, all portions of a building shall be presumed to be occupied at the same time.

EXCEPTION: Accessory areas, which ordinarily are only used by persons who occupy the main areas of occupancy, shall be provided with exits as though they were completely occupied. However, in computing the maximum allowable occupant load for the floor/building, the occupant load of the accessory area/s shall be disregarded.

- b. *Exit Requirements.* Exit requirements of a building or portion thereof used for different purposes shall be determined by the occupant load which gives the largest number of persons. No obstruction shall be placed in the required width of an exit except projections permitted by the Code.
- c. *Posting of Room Capacity.* Any room having an occupant load of more than fifty (50) where fixed seats are not installed, and which is used for classroom, assembly, or similar purpose shall have the capacity of the room posted in a conspicuous place near the main exit from the room.

- d. *Changes in Elevation.* Except in Group A Occupancies, changes in floor elevations of less than 300 millimeters along any exit serving a tributary occupant load of ten (10) or more shall be by means of ramp.

Table XII.1. General Requirements for Occupant Loads and Exits*

(*In all occupancies, floors above the first (1st) storey having an occupant load of more than ten (10) shall have at least two (2) exits)

Use or Occupancy	Unit Area per Occupant (sq. meters)	Minimum of Two (2) Exits Other than Elevators are Required Where Number of Occupants is Over
Dwellings	28.00	10
Hotels	18.60	10
Apartments	18.60	10
Dormitories	18.60	10
Classrooms	1.80	50
Conference Rooms	1.40	50
Exhibit Rooms	1.40	50
Gymnasia	1.40	50
School Shops	4.60	50
Vocational Institutions	4.60	50
Laboratories	4.60	50
Hospitals**, Sanitaria**	8.40	5
Nursing Homes**	7.40	5
Children's Homes**	7.40	5
Homes for the Aged**	7.40	5
(**Institutional Sleeping Departments shall be based on one (1) occupant per 11.00 sq. meters of the gross floor area; In-patient Institutional Treatment Departments shall be based on one (1) occupant per 22.00 sq. meters of gross floor area)		
Nurseries for Children	3.25	6
Dwellings	28.00	10
Stores-Retail Sales Rooms		
Basement	2.80	50
Ground Floor	2.80	50
Upper Floors	5.60-	10
Offices	9.30	30
Aircraft Hangars (no repair)	46.50	10
Parking Garages	18.60	30
Drinking Establishments	1.40	30
Kitchens (commercial)	18.60	50
Warehouses	28.00	30
Mechanical Equipment Rooms	28.00	30
Garages	9.30	10
Auditoriums	0.65	50
Theaters	0.65	50
Churches and chapels	0.65	50
Dance Floors	0.65	50
Reviewing Stands	0.65	50
Stadia	0.65	50

2. Exits

- a. *Number of Exits.* Every building or usable portion thereof shall have **at least one (1) exit**. In **all** occupancies, floors above the first storey having an occupant load of more than **ten (10)** shall not have less than **two (2)** exits. Each mezzanine floor used for other than storage purposes, if greater in area than 185 sq. meters or more than 18.00 meters in any dimension, shall have at least two (2) stairways to an adjacent floor. Every storey or portion thereof, having an occupant load of 500 to 999 shall have at least **three (3)** exits. Every storey or portion thereof having an occupant load of **one thousand (1000)** or more shall have at least **four (4)** exits. The number of exits required from any storey of a building shall be determined by using the occupant loads of floors which exit through the level under consideration as follows: 50% of the occupant load in the first adjacent storey above (and the first adjacent storey below, when a storey below exits through the level under consideration) and 25% of the occupant load in the storey immediately beyond the first adjacent storey. The **maximum** number of exits required for any storey shall be maintained until egress is provided from the structures. For purposes of this Section basement or cellars and occupied roofs shall be provided with exits as required for storeys. Floors above the second storey, basements and cellars used for other than service of the building shall have not less than **two (2)** exits.
 - b. *Width.* The total width of exits in meters shall **not** be less than the total occupant load served divided by **one hundred sixty five (165)**. Such width of exits shall be divided approximately equally among the **separate** exits. The total exit width required from any storey of a building shall be determined by using the occupant load of that storey plus the percentage of the occupant loads of floors which exits through the level under consideration as follows: 50% of the occupant load in the first adjacent storey above (and the first adjacent storey below when a storey below exits through the level under consideration) and 25% of the occupant load in the storey immediately beyond the first adjacent storey. The **maximum** exit width from any storey of a building shall be maintained.
 - c. *Arrangement of Exits.* If only **two (2)** exits are required, they shall be placed a distance apart to not less than one-fifth (1/5) of the perimeter of the area served measured in a straight line between exits. Where **three (3)** or more exits are required, they shall be arranged a reasonable distance apart so that if one becomes blocked, the others will be available.
 - d. *Distance to Exits.* **No** point in a building **without** a sprinkler system shall be more than 45.00 meters from an exterior exit door, a horizontal exit, exit passageway, or an enclosed stairway, measured along the line of travel. In a building equipped with a complete automatic fire extinguishing system, the distance from exits may be increased to 60.00 meters.
3. *Doors.* The provisions herein shall apply to every exit door serving an area having an occupant load of more than **ten (10)**, or serving hazardous rooms or areas.
 - a. *Swing.* Exit door shall swing in the direction of exit travel when serving any hazardous areas or when serving an occupant load of fifty (50) or more. Double acting doors shall **not** be used as exits serving a tributary occupant load of more than one hundred (100); nor shall they be used as a part of fire assembly, nor equipped with panic hardware. A double acting door shall be provided with a view panel of **not** less than 1,300 sq. centimeters.
 - b. *Type of Lock or Latch.* Exit door shall be openable from the inside without the use of a key or any special knowledge or effort: *Except*, that this requirement shall **not** apply to exterior exit doors in a Group E or F Occupancy if there is a conspicuous, readily visible and durable sign on or adjacent to the door, stating that the door is to remain unlocked during business hours. The locking device must be of a type that will readily be distinguishable as locked. **Flush bolts or surface bolts are prohibited.**

- c. *Width and Height.* Every required exit doorway shall be of a size as to permit the installation of a door not less than 900 millimeters in width and not less than 2.00 meters in height. When installed in exit doorways, exit doors shall be capable of opening at least 90 degrees and shall be so mounted that the clear width of the exitway is not less than 700 millimeters. In computing the required exit width the net dimension of the exitway shall be used.
 - d. *Door Leaf Width.* **No** leaf of an exit door shall exceed 1.20 meters in width.
 - e. *Special Doors.* Revolving, sliding, and overhead doors shall not be used as required exits.
 - f. *Egress from Door.* Every required exit door shall give immediate access to an approved means of egress from the building.
 - g. *Change in Floor Level at Doors.* Regardless of the occupant load, there shall be a floor or landing on each side of an exit door. The floor or landing shall be leveled with, or not more than 50 millimeters lower than the threshold of the doorway: *Except*, that in Group A and B Occupancies, a door may open on the top step of a flight of stairs or an exterior landing provided the door does not swing over the top step or exterior landing and the landing is not more than 200 millimeters below the floor level.
 - h. *Door Identification.* Glass doors shall conform to the requirements in **Section 1802**. Other exit doors shall be so marked that they are readily distinguishable from the adjacent construction.
 - i. *Additional Doors.* When additional doors are provided for egress purposes, they shall conform to all provisions in the following cases: Approved revolving doors having leaves which will collapse under opposing pressures may be used in exit situations; *provided*; that such doors have a minimum width of 2.00 meters or they are not used in occupancies where exits are required to be equipped with panic hardware or at least **one** conforming exit door is located adjacent to each revolving doors installed in a building and the revolving door shall **not** be considered to provide any exit width.
4. *Corridors and Exterior Exit Balconies.* The provisions herein shall apply to every corridor and exterior exit balcony serving as a required exit for an occupant load of more than **ten** (10).
- a. *Width.* Every corridor or exit balcony shall not be less than 1.10 meters in width.
 - b. *Projections.* The required width of corridors and exterior exit balconies shall be unobstructed. *Except*, that trim handrails, and doors when fully opened shall not reduce the required width by more than 200 millimeters. Doors in any position shall not reduce the required width of the corridor by more than one-half (1/2).
 - c. *Access to Exits.* When more than **one** (1) exit is required, they shall be so arranged to allow going to either direction from any point in the corridor or exterior exit balcony to a separate exit, except for dead ends permitted by the Code.
 - d. *Dead Ends.* Corridors and exterior exit balconies with dead ends are permitted when the dead end does not exceed 6.00 meters in length.
 - e. *Construction.* Walls and ceilings of corridors shall **not** be less than one-hour fire-resistive construction. Provided, that this requirement shall not apply to exterior exit balconies, railings, and corridors of one-storey building housing a Group E and F Occupancy occupied by **one** (1) tenant only and which serves an occupant load of thirty (30) or less, nor to corridors, formed by temporary partitions. Exterior exit balconies shall not project into an area where protected openings are required.

- f. *Openings.* Where corridor wall are required to be **one-hour fire-resistive** construction, every interior door opening shall be protected as set forth in generally recognized and accepted requirements for dual-purpose fire exit doors. Other interior openings except ventilation louvers equipped with approved automatic fire shutters shall be 7 millimeters thick fixed wire glass set in steel frames. The total area of **all** openings other than doors, in any portion of an interior corridor wall shall not exceed 25% of the area of the corridor wall of the room being separated from the corridor.
5. *Stairways.* Except stairs or ladders used only to access equipment, every stairway serving any building or portion thereof shall conform to the following requirements:
- a. *Width.* Stairways serving an occupant load of more than fifty (50) shall **not** be less than 1.10 meters. Stairways serving an occupant load of fifty (50) or less may be 900 millimeters wide. Private stairways serving an occupant load of less than ten (10) may be 750 millimeters. Trim and handrails shall not reduce the required width by more than 100 millimeters.
- b. *Rise and Run.* The rise of every step in a stairway shall not exceed 200 millimeters and the run shall not be less than 250 millimeters. The maximum variations in the height of risers and the width of treads in any one flight shall be 5 millimeters: *Except*, in case of private stairways serving an occupant load of less than ten (10), the rise may be 200 millimeters and the run may be 250 millimeters, except as provided in sub-paragraph (c) below.
- c. *Winding Stairways.* In Group A Occupancy and in private stairways in Group B Occupancies, winders may be used if the required width of run is provided at a point not more than 300 millimeters from the side of the stairway where the treads are narrower but in no case shall any width of run be less than 150 millimeters at any point.
- d. *Circular Stairways.* Circular stairs may be used as an exit provided the minimum width of run is not less than 250 millimeters. All treads in any one flight between landings shall have identical dimensions within a 5 millimeters tolerance.
- e. *Landings.* Every landing shall have a dimension measured in the direction of travel equal to the width of the stairway. Such dimension need not exceed 1.20 meters when the stairs has a straight run. Landings when provided shall not be reduced in width by more than 100 millimeters by a door when fully open.
- f. *Basement Stairways.* Where a basement stairway and a stairway to an upper storey terminate in the same exit enclosure, an approved barrier shall be provided to prevent persons from continuing on to the basements. Directional exit signs shall be provided as specified in the **Code**.
- g. *Distance Between Landings.* There shall be not more than 3.60 meters vertical distance between landings.
- h. *Handrails.* Stairways shall have handrails on each side and every stairway required to be more than 3.00 meters in width shall be provided with not less than one intermediate handrail for each 3.00 meters of required width. Intermediate handrails shall be spaced approximately equal within the entire width of the stairway. Handrails shall be placed not less than 800 millimeters nor more than 900 millimeters above the nosing of treads, and ends of handrails shall be returned or shall terminate in newel posts or safety terminals: *Except*, in the following cases: Stairways 1.10 meters or less in width and stairways serving one (1) individual dwelling unit in Group A or B Occupancies may have one handrail, except that such stairway, open on one or both, sides shall have handrails provided on the open side or sides: or stairways having less than four (4) risers need not have handrails.

- i. *Exterior Stairway Protection.* All openings in the exterior wall below or within 3.00 meters, measured horizontally, of an exterior exit stairway serving a building over two storeys in height shall be protected by a self-closing fire assembly having a **three-fourth - hour fire-resistive rating**; *Except*, that openings may be unprotected when two separated exterior stairways serve an exterior exit balcony.
 - j. *Stairway Construction*
 - i. *Stairway Construction - Interior.* Interior stairways shall be constructed as specified in this Code. Where there is enclosed usable space under the stairs the walls and soffits of the enclosed space shall be protected on the enclosed side as required for one-hour fire resistive construction.
 - ii. *Stairway Construction - Exterior.* Exterior stairways shall be of incombustible material: *Except*, that on Type III buildings which do **not** exceed two storeys in height, which are located in **less fire-restrictive** Fire Zones, as well as on **Type I** buildings which may be of wood not less than 50 millimeters in nominal thickness. Exterior stairs shall be protected as required for exterior walls due to location on property as specified in the **Code**. Exterior stairways shall **not** project into an area where openings are required to be protected. Where there is enclosed usable space under stairs, the walls and soffits of the enclosed space shall be protected on the enclosed side as required for **one-hour fire-resistive** construction.
 - k. *Stairway to Roof.* In every building four (4) or more storeys in height, one (1) stairway shall extend to the roof unless the roof has a slope greater than 1 in 3.
 - l. *Headroom.* Every required stairway shall have a headroom clearance of **not** less than 2.00 meters. Such clearance shall be established by measuring vertically from a plane parallel and tangent to the stairway tread nosing to the soffit above all points.
6. *Ramps.* A ramp conforming to the provisions of the **Code** may be used as an exit. The width of ramps shall be as required for corridors.
7. *Horizontal Exit.* If conforming to the provisions of the **Code**, a horizontal exit may be considered as the required exit. **All** openings in a separation wall shall be protected by a fire assembly having a fire-resistive rating of **not** less than one hour. A horizontal exit shall not lead into a floor area having a capacity for an occupant load **not** less than the occupant load served by such exit. The capacity shall be determined by allowing 0.30 sq. meter of net floor area per ambulatory occupant and 1.90 sq. meters per non-ambulatory occupant. The dispersal area into which the horizontal exit leads shall be provided with exits as required by the **Code**.
8. *Exit Enclosure.* Every interior stairway, ramp, or escalator shall be enclosed as specified in the Code; *Except*, that in other than Group D Occupancies, an enclosure will **not** be required for stairway, ramp, or escalator serving only one adjacent floor and not connected with corridors or stairways serving other floors. Stairs in Group A Occupancies need **not** be enclosed.
- a. Enclosure walls shall **not** be less than **two-hour fire-resistive** construction. There shall be **no** openings into exit enclosures except exit doorways and openings in exterior walls. **All** exit doors in an exit enclosure shall be appropriately protected.
 - b. Stairway and ramp enclosures shall include landings and parts of floors connecting stairway flights and shall include a corridor on the ground floor leading from the stairway to the exterior of the building. Enclosed corridors or passageways are **not** required for unenclosed stairways.

- c. A stairway in an exit enclosure shall **not** continue below the grade level exit unless an approved barrier is provided at the ground floor level to prevent persons from accidentally continuing into the basement.
- d. There shall be **no** enclosed usable space under stairways in an exit enclosure, nor shall the open space under such stairways be used for any purpose.

9. *Smokeproof Enclosures*

A smokeproof enclosure shall consist of a vestibule and a continuous stairway enclosed from the highest point to the lowest point by walls of **two-hour fire-resistive** construction. In buildings five (5) storeys or more in height, one of the required exits shall be a smokeproof enclosure.

- a. Stairs in smokeproof enclosures shall be of incombustible construction.
- b. There shall be **no** openings in smokeproof enclosures, except exit doorways and openings in exterior walls. There shall be **no** openings directly into the interior of the building. Access shall be through a vestibule with one (1) wall at least 50% open to the exterior and having an exit door from the interior of the building and an exit door leading to the smokeproof enclosure. In lieu of a vestibule, access may be by way of an open exterior balcony of incombustible materials.
- c. The opening from the building to the vestibule or balcony shall be protected with a self-closing fire assembly having one-hour fire-resistive rating. The opening from the vestibule or balcony to the stair tower shall be protected by a self-closing fire assembly having a **one-hour fire-resistive** rating.
- d. A smokeproof enclosure shall exit into a public way or into an exit passageway leading to a public way. The exit passageway shall be without other openings and shall have walls, floors, and ceilings of **two-hour fire-resistance**.
- e. A stairway in a smokeproof enclosure shall **not** continue below the grade level exit unless an approved barrier is provided at a ground floor level to prevent persons from accidentally walking into the basement.

10. *Exit Outlets, Courts, and Passageways*

Every exit shall discharge into a public way, exit court, or exit passageway. Every exit court shall discharge into a public way or an exit passageway. Passageways shall be without openings other than required exits and shall have walls, floors, and ceilings of the same period of fire-resistance as the walls, floors and ceilings of the building but shall **not** be less than one-hour fire-resistive construction.

a. *Width*

Every exit court and exit passageways shall be at least as wide as the required total width of the tributary exits, such required width being based on the occupant load served. The required width of exit courts or exit passageways shall be unobstructed except as permitted in corridors. At any point where the width of an exit court is reduced from any cause, the reduction in width shall be affected gradually by a guardrail at least 900 millimeters in height. The guardrail shall make an angle of not more than 30° with the axis of the exit court.

b. *Slope*

The slope of exit courts shall not exceed 1 in 10. The slope of exit passageway shall **not** exceed 1 in 8.

c. *Number of Exits*

Every exit court shall be provided with exits as required in the **Code**.

d. *Openings*

All openings into an exit court less than 3.00 meters wide shall be protected by fire assemblies having **not** less than three-fourth - hour fire-resistive rating. *Except*, that openings more than 3.00 meters above the floor of the exit court may be unprotected.

11. *Exit Signs and Illuminations*

Exits shall be illuminated at any time the building is occupied with lights having an intensity of not less than 10.7 LUX at floor level; *Except*, that for Group A Occupancies, the exit illumination shall be provided with separate circuits or separated sources of power (but **not** necessarily separate from exit signs when these are required for exit sign illumination).

12. *Aisles*

Every portion of every building in which are installed seats, tables, merchandise, equipment, or similar materials shall be provided with aisles leading to an exit.

a. *Width*

Every aisle shall be not less than 800 millimeters wide if serving only one side, and not less than 1.00 meter wide if serving both sides. Such minimum width shall be measured at the point farthest from an exit, cross aisle, or foyer and shall be increased by 30 millimeters for every meter in length towards the exit, cross aisle or foyer.

Side aisles shall not be less than 1.10 meters in width.

b. *Exit Distance*

In areas occupied by seats and in Groups H and I Occupancies without seats, the line of travel to an exit door by an aisle shall be not more than 45.00 meters. With standard spacing, as specified in the **Code**, aisles shall be so located that there will be **not** more than seven (7) seats between the wall and an aisle and **not** more than fourteen (14) seats between aisles. The number of seats between aisles may be increased to thirty (30) where exits doors are provided along each side aisle of the row of seats at the rate of one (1) pair of exit doors for every five (5) rows of seats, provided further that the distance between seats back to back is at least 1.00 meter. Such exit doors shall provide a minimum clear width of 1.70 meters.

c. *Cross Aisles*

Aisles shall terminate in a cross aisle, foyer, or exit. The width of the cross aisle shall be **not** less than the sum of the required width of the widest aisle plus 50% of the total required width of the remaining aisle leading thereto. In Groups C, H and E Occupancies, aisles shall **not** be provided a dead end greater than 6.00 meters in length.

d. *Vomitories*

Vomitories connecting the foyer or main exit with the cross aisles shall have a total width not less than the sum of the required width of the widest aisles leading thereto plus 50% of the total required width of the remaining aisles leading thereto.

e. *Slope*

The slope portion of aisles shall not exceed a fall of 1 in 8.

13. *Seats*

a. *Seat Spacing*

With standard seating, the spacing of rows of seats from back-to-back shall be **not** less than 840 millimeters. With continental seating, the spacing of rows of unoccupied seats shall provide a clear width measured horizontally, as follows: 450 millimeters clear for rows of eighteen (18) seats or less; 500 millimeters clear for rows of thirty five (35) seats or less; 525 millimeters clear for rows of forty five (45) seats or less; and 550 millimeters clear for rows of forty six (46) seats or more.

b. *Width*

The width of any seat shall be **not** less than 450 millimeters.

14. *Reviewing Stands, Grandstands, and Bleachers*

a. *Height of Stands*

Stands made of combustible framing shall be limited to eleven (11) rows or 2.70 meters in height.

b. *Design Requirements*

The minimum unit live load for reviewing stands, grandstands, and bleachers shall be 500 kilograms per square meter of horizontal projection for the structure as a whole. Seat and footboards shall be 180 kilograms per linear meter. The sway force, applied to seats, shall be 35 kilograms per linear meter parallel to the seats and 15 kilograms per linear meter perpendicular to the seats. Sway forces need not be applied simultaneously with other lateral forces.

c. *Spacing of Seats*

i. *Row Spacing*

The minimum spacing of rows of seats measured from back-to-back shall be: 600 millimeters for seats without backrests in open air stands; 750 millimeters for seats with backrests; and 850 millimeters for chair seating. There shall be a space of **not** less than 300 millimeters between the back of each seat and the front of the seat immediately behind it.

ii. *Rise Between Rows*

The maximum rise from one row of seats to the next shall not exceed 400 millimeters.

iii. *Seating Capacity*

For determining the seating capacity of a stand, the width of any seat shall **not** be less than 450 millimeters nor more than 480 millimeters.

iv. *Number of Seats Between Aisles*

The number of seats between any seat and an aisle shall **not** be greater than fifteen (15) for open air stands with seats without backrests, a far open air stands with seats having backrests and seats without backrests within buildings and **six** (6) for seats with backrests in buildings.

d. *Aisles*

i. *Aisles Required*

Aisles shall be provided in **all** stands; *Except*, that aisles may be omitted when all the following conditions exist: Seats are without backrests; the rise from row to row does not exceed 300 millimeters per row; the number of rows does not exceed **eleven** (11) in height; the top seating board is **not** over 3.00 meters above grade; and the first seating board is not more than 500 millimeters above grade.

ii. *Obstructions*

No obstruction shall be placed in the required width of any aisle or exitway.

iii. *Stairs Required*

When an aisle is elevated more than 200 millimeters above grade, the aisle shall be provided with a stairway or ramp whose width is not less than the width of the aisle.

iv. *Dead End*

No vertical aisle shall have a dead end more than sixteen (16) rows in depth regardless of the number of exits required.

v. *Width*

Aisles shall have a minimum width of 1.10 meters.

e. *Stairs and Ramps*

The requirements in the **Code** shall apply to all stairs and ramps except for portions that pass through the seating area.

i. *Stair Rise and Run*

The maximum rise of treads shall **not** exceed 200 millimeters and the minimum width of the run shall be 280 millimeters. The maximum variation in the width of treads in any one (1) flight shall **not** be more than 5 millimeters and the maximum variation in one (1) height of two (2) adjacent rises shall not exceed 5 millimeters.

ii. *Ramp Slope*

The slope of a ramp shall **not** exceed 1 in 8. Ramps shall be roughened or shall be of approved non-slip material.

iii. *Handrails*

A ramp with a slope exceeding 1 in 10 shall have handrails. Stairs for stands shall have handrails. Handrails shall conform to the requirements of the **Code**.

f. *Guardrails*

- i. Guardrails shall be required in all locations where the top of a seat plank is more than 1.20 meters above the grade and at the front of stands elevated more than 600 millimeters above grade. Where only sections of stands are used, guardrails shall be provided as required in the **Code**.
- ii. Railings shall be 1.10 meters above the rear of a seat plank or 1.10 meters above the rear of the steps in an aisle when the guardrail is parallel and adjacent to the aisle; *Except*, that the height may be reduced to 900 millimeters for guardrails located in front of the grandstand.
- iii. A midrail shall be placed adjacent to any seat to limit the open distance above the top of any part of a seat to 250 millimeters where the seat is at the extreme end or at the extreme rear of the bleachers or grandstand. The intervening space shall have one additional rail midway in the opening; *Except*, that railings may be omitted when stands are placed directly against a wall or fence giving equivalent protection; stairs and ramps shall be provided with guardrails. Handrails at the front of stands and adjacent to an aisle shall be designed to resist a load of 75 kilograms per linear meter applied at the top rail. Other handrails shall be designed to resist a load of 40 kilograms per linear meter.

g. *Foot Boards*

Footboards shall be provided for all rows of seats above the third (3rd) row or beginning at such point where the seating plank is more than 600 millimeters above grade.

h. *Exits*

i. *Distance to Exit*

The line of travel to an exit shall **not** be more than 45.00 meters. For stands with seats without backseats, this distance may be measured by direct line from a seat to the exit from the stand.

ii. *Aisle Used as Exit*

An aisle may be considered as only one (1) exit unless it is continuous at both ends to a legal building exit or to a safe dispersal area.

iii. *Two (2) Exits Required*

A stand with the first (1st) seating board **not** more than 500 millimeters above grade of floor may be considered to have two (2) exits when the bottom of the stand is open at both ends. Every stand or section of a stand within a building shall have at least two means of egress when the stand accommodates more than fifty (50) persons. Every open air stand having seats without backrests shall have at least two (2) means of egress when the stand accommodates more than three hundred (300) persons.

iv. *Three (3) Exits Required*

Three (3) exits shall be required for stands within a building when there are more than 300 occupants within a stand and for open air stands with seats without backrests where a stand or section of a stand accommodates more than one thousand (1000) occupants.

v. *Four (4) Exits Required*

Four (4) exits shall be required when a stand or section of a stand accommodates more than 1000 occupants; *Except*, that for an open air stand with seats without backrest four (4) exits need **not** be provided unless there are accommodations for more than three thousand (3000) occupants.

vi. *Width*

The total width of exits in meters shall not be less than the total occupant load served divided by one hundred sixty five (165); *Except*, that for open air stands with seats without backrest the total width of exits in meters shall be not less than the total occupant load served divided by five hundred (500) when exiting by stairs, and divided by six hundred fifty (650) when exiting by ramps or horizontally. When both horizontal and stair exits are used, the total width of exits shall be determined by using both figures as applicable. No exit shall be less than 1.10 meters in width. Exits shall be located at a reasonable distance apart. When only two (2) exits are provided, they shall be spaced not less than one-fifth (1/5) of the perimeter apart.

i. *Securing of Chairs*

Chairs and benches used on raised stands shall be secured to the platforms upon which they are placed; *Except*, that when less than twenty five (25) chairs are used upon a single raised platform the fastening of seats to the platform may be omitted. When more than five hundred (500) loose chairs are used in connection with athletic events, chairs shall be fastened together in groups of **not** less than three (3), and shall be tied or staked to the ground.

j. *Safe Dispersal Area*

Each safe dispersal area shall have at least two (2) exits. If more than six thousand (6000) persons are to be accommodated within such an area, there shall be a minimum of three (3) exits, and for more than nine thousand (9000) persons there shall be a minimum of four (4) exits. The aggregate clear width of exits from a safe dispersal area shall be determined on the basis of not less than one (1) exit unit of 600 millimeters for each five hundred (500) persons to be accommodated and no exit shall be less than 1.10 meters in width, a reasonable distance apart that shall be spaced not less than one-fifth (1/5) of the perimeter of the area apart from each other.

15. *Special Hazards*

a. *Boiler Rooms*

Except in Group A Occupancies, every boiler room and every room containing an incinerator or liquefied petroleum gas or liquid fuel-fired equipment shall be provided with at least two (2) means of egress, one of which may be a ladder. All interior openings shall be protected as provided for in the **Code**.

b. *Cellulose Nitrate Handling*

Film laboratories, projection rooms, and nitro-cellulose processing rooms shall have not less than two exits.

SECTION 1208. Skylights

1. All skylights shall be constructed with metal frames except those for Groups A and J Occupancies. Frames of skylights shall be designed to carry loads required for roofs. All skylights, the glass of which is set at an angle of less than 45° from the horizontal, if located above the first storey, shall

be set at least 100 millimeters above the roof. Curbs on which the skylights rest shall be constructed of incombustible materials except for Types I or II Construction.

2. Spacing between supports in one direction for flat wired glass in skylights shall not exceed 625 millimeters. Corrugated wired glass may have supports 1.50 meters apart in the direction of the corrugation. All glass in skylights shall be wired glass; *Except*, that skylights over vertical shafts extending through two (2) or more storeys shall be glazed with plain glass as specified in the Code; *Provided*, that wired glass may be used in ventilation equal to not less than one-eighth (1/8) the cross-sectional area of the shaft but never less than 1.20 meters provided at the top of such shaft. Any glass not wired glass shall be protected above and below with a screen constructed of wire not smaller than 2.5 millimeters in diameter with a mesh not larger than 25 millimeters. The screen shall be substantially supported below the glass.
3. Skylights installed for the use of photographers may be constructed of metal frames and plate glass without wire netting.
4. Ordinary glass may be used in the roof and skylights for greenhouses, *Provided*, that height of the greenhouses at the ridge does not exceed 6.00 meters above the grade. The use of wood in the frames of skylights will be permitted in greenhouses outside of highly restrictive Fire Zones if the height of the skylight does not exceed 6.00 meters above the grade, but in other cases metal frames and metal sash bars shall be used.
5. Glass used for the transmission of light, if placed in floors or sidewalks, shall be supported by metal or reinforced concrete frames, and such glass shall not be less than 12.5 millimeters in thickness. Any such glass over 100 sq. centimeters in area shall have wire mesh embedded in the same or shall be provided with a wire screen underneath as specified for skylights in the Code. All portions of the floor lights or sidewalk lights shall be of the same strength as required for floor or sidewalk construction, except in cases where the floor is surrounded by a railing not less 1.10 meters in height, in which case the construction shall be calculated for not less than roof loads.

SECTION 1209. Bays, Porches, and Balconies

Walls and floors in bay and oriel windows shall conform to the construction allowed for exterior walls and floors of the type of construction of the building to which they are attached. The roof covering of a bay or oriel window shall conform to the requirements of the roofing of the main roof. Exterior balconies attached to or supported by wall required to be of masonry, shall have brackets or beams constructed of incombustible materials. Railings shall be provided for balconies, landings, or porches which are more than 750 millimeters above grade.

SECTION 1210. Penthouses and Roof Structures

1. *Height*

No penthouse or other projection above the roof in structures of other than Type V construction shall exceed 8.40 meters above the roof when used as an enclosure for tanks or for elevators which run to the roof and in all other cases shall not extend more than 3.60 meters in height with the roof.

2. *Area*

The aggregate area of all penthouses and other roof structures shall **not** exceed one third (1/3) of the area of the supporting roof.

3. *Prohibited Uses*

No penthouse, bulkhead, or any other similar projection above the roof shall be used for purposes other than shelter of mechanical equipment or shelter of vertical shaft openings in the roof. A penthouse or bulkhead used for purposes other than that allowed by this Section shall conform to the requirements of the **Code** for an additional storey.

4. *Construction*

Roof structures shall be constructed with walls, floors, and roof as required for the main portion of the building except in the following cases:

- a. On Types III and IV constructions, the exterior walls and roofs of penthouses which are 1.50 meters or more from an adjacent property line may be of one-hour fire-resistive incombustible construction.
- b. Walls not less than 1.50 meters from an exterior wall of a Type IV construction may be of one-hour fire-resistive incombustible construction.

The above restrictions shall not prohibit the placing of wood flagpoles or similar structures on the roof of any building.

5. *Towers and Spires*

Towers and spires when enclosed shall have exterior walls as required for the building to which they are attached. Towers **not** enclosed and which extend more than 20.00 meters above the grade shall have their framework constructed of iron, steel, or reinforced concrete. No tower or spire shall occupy more than one-fourth (1/4) of the street frontage of any building to which it is attached and in no case shall the base area exceed 150.00 sq. meters unless it conforms entirely to the type of construction requirements of the building to which it is attached and is limited in height as a main part of the building. If the area of the tower and spire exceeds 10.00 sq. meters on any horizontal cross section, its supporting frames shall extend directly to the ground. The roof covering of the spires shall be as required for the main room of the rest of the structure. Skeleton towers used as radio masts, neon signs, or advertisement frames and placed on the roof of any building shall be constructed entirely of incombustible materials when more than 7.50 meters in height, and shall be directly supported on an incombustible framework to the ground. No such skeleton towers shall be supported on roofs of combustible framings. They shall be designed to withstand a wind load from any direction in addition to any other loads.

SECTION 1211. Chimneys, Fireplaces, and Barbecues

1. *Chimneys*

a. *Structural Design*

Chimneys shall be designed, anchored, supported, reinforced, constructed, and installed in accordance with generally accepted principles of engineering. Every chimney shall be capable of producing a draft at the appliance not less than that required for the safe operation of the appliance connected thereto. No chimney shall support any structural load other than its own weight unless it is designed to act as a supporting member. Chimneys in a wood-framed building shall be anchored laterally at the ceiling line and at each floor line which is more than 1.80 meters above grade, except when entirely within the framework or when designed to be free standing.

b. *Walls*

Every masonry chimney shall have walls of masonry units, bricks, stones, listed masonry chimney units, reinforced concrete or equivalent solid thickness of hollow masonry and lined with suitable liners in accordance with the following requirements:

i. *Masonry Chimneys for Residential Type Appliances*

Masonry chimneys shall be constructed of masonry units or reinforced concrete with walls not less than 100 millimeters thick; or of rubble stone masonry not less than 300 millimeters thick. The chimney liner shall be in accordance with the Code.

ii. *Masonry Chimneys for Low Heat Appliances*

Masonry chimneys shall be constructed of masonry units or reinforced concrete with walls not less than 200 millimeters thick; *Except*, that rubble stone masonry shall be not less than 300 millimeters thick. The chimney liner shall be in accordance with the Code.

iii. *Masonry Chimneys for Medium-Heat Appliances*

Masonry chimneys for medium-heat appliances shall be constructed of solid masonry units or reinforced concrete not less than 200 millimeters thick, *Except*, that stone masonry shall be not less than 300 millimeters thick and, in addition shall be lined with not less than 100 millimeters of firebrick laid in a solid bed of fire clay mortar with solidly filled head, bed, and wall joints, starting not less than 600 millimeters below the chimney connector entrance. Chimneys extending 7.50 meters or less above the chimney connector shall be lined to the top.

iv. *Masonry Chimneys for High-Heat Appliances*

Masonry chimneys for high-heat appliances shall be constructed with double walls of solid masonry units or reinforced concrete not less than 200 millimeters in thickness, with an air space of not less than 50 millimeters between walls. The inside of the interior walls shall be of firebrick not less than 100 millimeters in thickness laid in a solid bed of fire clay mortar with solidly filled head, bed, and wall joints.

v. *Masonry Chimneys for incinerators installed in Multi-Storey Buildings (Apartment-Type Incinerators)*

Chimneys for incinerators installed in multi-storey buildings using the chimney passageway as a refuse chute where the horizontal grate area of combustion chamber does not exceed 0.80 sq. meter shall have walls of solid masonry or reinforced concrete, not less than 100 millimeters thick with a chimney lining as specified in the Code. If the grate area of such an incinerator exceeds 0.80 sq. meter, the walls shall not be less than 100 millimeters of firebrick except that higher than 9.00 meters above the roof of the combustion chamber, common brick alone 200 millimeters in thickness may be used.

vi. *Masonry Chimneys for Commercial and Industrial Type Incinerators*

Masonry chimneys for commercial and industrial type incinerators of a size designed for not more than 110 kilograms of refuse per hour and having a horizontal grate area not exceeding 0.50 sq. meter shall have walls of solid masonry or reinforced concrete not less than 100 millimeters thick with lining of not less than 100 millimeters of firebrick, which lining shall extend for **not** less than 12.00 meters above the roof of the combustion chamber. If the design capacity of grate area of such an incinerator exceeds 110 kilograms per hour and 0.80 sq. meter respectively, walls shall not be less than 200

millimeters thick, lined with not less than 100 millimeters of firebrick extending the full height of the chimney.

c. *Linings*

Fire clay chimney lining shall **not** be less than 15 millimeters thick. The lining shall extend from 200 millimeters below the lowest inlet or, in the case of fireplace, from the throat of the fireplace to a point above enclosing masonry walls. Fire clay chimney linings shall be installed ahead of the construction of the chimney as it is carried up, carefully bedded one on the other in fire clay mortar, with close-fitting joints left smooth on the inside. Firebrick not less than 500 millimeters thick may be used in place of fire clay chimney.

d. *Area*

No chimney passageway shall be smaller in area than the vent connection of the appliance attached thereto.

e. *Height*

Every masonry chimney shall extend at least 600 millimeters above the part of the roof through which it passes and at least 600 millimeters above the highest elevation of any part of a building within 3.00 meters to the chimney.

f. *Corbeling*

No masonry chimney shall be corbeled from a wall more than 150 millimeters nor shall a masonry chimney be corbeled from a wall which is less than 300 millimeters in thickness unless it projects equally on each side of the wall. In the second (2nd) storey of a two-storey building of Group A Occupancy, corbeling of masonry chimneys on the exterior of the enclosing walls may equal the wall thickness. In every case the corbeling shall **not** exceed 25 millimeters projection for each course of brick.

g. *Change in Size or Shape*

No change in the size or shape of a masonry chimney shall be made within a distance of 150 millimeters above or below the roof joints or rafters where the chimney passes through the roof.

h. *Separation*

When more than one passageway is contained in the same chimney, masonry separation at least 100 millimeters thick bonded into the masonry wall of the chimney shall be provided to separate passageways.

i. *Inlets*

Every inlet to any masonry chimney shall enter the side thereof and shall be of not less than 3 millimeters thick metal or 16 millimeters refractory material.

j. *Clearance*

Combustible materials shall not be placed within 50 millimeters of smoke chamber or masonry chimney walls when built within a structure, or within 25 millimeters when the chimney is built entirely outside the structure.

k. *Termination*

All incinerator chimneys shall terminate in a substantially constructed spark arrester having a mesh **not** exceeding 20 millimeters.

l. *Cleanouts*

Cleanout openings shall be provided at the base of every masonry chimney.

2. *Fireplaces and Barbecues*

Fireplaces, barbecues, smoke chambers, and fireplace chimneys shall be of solid masonry or reinforced concrete and shall conform to the minimum requirements specified in the **Code**.

a. *Fireplace Walls*

Walls of fireplaces shall **not** be less than 200 millimeters in thickness. Walls of fireboxes shall not be less than 250 millimeters in thickness; *Except*, that where a lining of firebrick is used, such walls shall not be less than 200 millimeters in thickness. The firebox shall **not** be less than 500 millimeters in depth. The maximum thickness of joints in firebrick shall be 10 millimeters.

b. *Hoods*

Metal hoods used as part of a fireplace or barbecue shall be not less than No. 18 gauge copper, galvanized iron, or other equivalent corrosion-resistant ferrous metal with all seams and connections of smokeproof unsoldered construction. The hoods shall be sloped at an angle of 45° or less from the vertical and shall extend horizontally at least 150 millimeters beyond the limits of the firebox. Metal hoods shall be kept a minimum of 400 millimeters from combustible materials.

c. *Circulators*

Approved metal heat circulators may be installed in fireplaces.

d. *Smoke Chamber*

Front and side walls shall not be less than 200 millimeters in thickness. Smoke chamber back walls shall **not** be less than 150 millimeters in thickness.

e. *Fireplace Chimneys*

Walls of chimneys without flue lining shall **not** be less than 200 millimeters in thickness. Walls of chimneys with flue lining shall **not** be less than 100 millimeters in thickness and shall be constructed in accordance with the requirements of the **Code**.

f. *Clearance to Combustible Materials*

Combustible materials shall **not** be placed within 50 millimeters of fireplace, smoke chamber, or chimney walls when built entirely within a structure, or within 25 millimeters when the chimney is built entirely outside the structure. Combustible materials shall not be placed within 150 millimeters of the fireplace opening. No such combustible material within 300 millimeters of the fireplace opening shall project more than 3 millimeters for each 25 millimeters clearance from such opening. No part of metal hoods used as part of a fireplace, barbecue or heating stoves shall be less than 400 millimeters from combustible material. This clearance may be reduced to the minimum requirements set forth in the **Code**.

g. *Area of Flues, Throats, and Dampers*

The net cross-sectional area of the flue and of the throat between the firebox and the smoke chamber of a fireplace shall **not** be less than the requirements to be set forth by the Secretary. Where dampers are used, they shall be of not less than No. 12 gauge metal. When fully opened, damper opening shall be **not** less than 90% of the required flue area. When fully open, damper blades shall not extend beyond the line of the inner face of the flue.

h. *Lintel*

Masonry over the fireplace opening shall be supported by a non-combustible lintel.

i. *Hearth*

Every fireplace shall be provided with a brick, concrete, stone, or other approved non-combustible hearth slab at least 300 millimeters wider on each side than the fireplace opening and projecting at least 450 millimeters therefrom. This slab shall **not** be less than 100 millimeters thick and shall be supported by a noncombustible material or reinforced to carry its own weight and all imposed loads.

SECTION 1212. Fire-Extinguishing Systems

1. *Fire-Extinguishing Systems* - Where required, standard automatic fire-extinguishing systems shall be installed in the following places, and in the manner provided in the Code.
 - a. In every storey, basement or cellar with an area of 200.00 sq. meters or more which is used for habitation, recreation, dining, study, or work, and which has an occupant load of more than twenty (20).
 - b. In all dressing rooms, rehearsal rooms, workshops or factories, and other rooms with an occupant load of more than ten (10) or assembly halls under Group H and I Occupancies with occupant load of more than five hundred (500), and if the next doors of said rooms are more than 30.00 meters from the nearest safe fire dispersal area of the building or opening to an exit court or street.
 - c. In **all** rooms used for storage or handling of photographic x-ray nitrocellulose films and other inflammable articles.
2. *Dry Standpipes* - Every building **four** (4) or more storeys in height shall be equipped with one or more dry standpipes.
 - a. *Construction and Tests* - Dry standpipes shall be of wrought iron or galvanized steel and together with fittings and connections shall be of sufficient strength to withstand 20 kilograms per square centimeter of water pressure when ready for service, without leaking at the joints, valves, or fittings. Tests shall be conducted by the owner or the building contractor in the presence of a representative of the **Building Official** whenever deemed necessary for the purpose of certification of its proper function.
 - b. *Size* - Dry standpipes shall be of such size as to be capable of delivering 900 liters of water per minute from each of any three (3) outlets simultaneously under the pressure created by one (1) fire engine or pumper based on the standard equipment available.
 - c. *Number Required* - Every building four (4) or more storeys in height where the area of any floor above the third (3rd) floor is 950 sq. meters or less, shall be equipped with at least one (1) dry standpipe and an additional standpipe shall be installed for each additional 950 sq. meters or fraction thereof.

- d. *Location* - Standpipes shall be located within enclosed stairway landings or near such stairways as possible or immediately inside of an exterior wall and within 300 millimeters of an opening in a stairway enclosure of the balcony or vestibule of a smokeproof tower or an outside exit stairway.
 - e. *Siamese Connections* - Subject to the provisions of subparagraph (b) all 100 millimeters dry standpipes shall be equipped with a two-way Siamese fire department connection. All 125 millimeters dry standpipes shall be equipped with a three-way Siamese fire department connection, and 150 millimeters dry standpipes shall be equipped with four-way Siamese fire department connections. All Siamese inlet connections shall be located on a street-front of the building and not less than 300 millimeters nor more than 1.20 meters above the grade and shall be equipped with a clapper-checks and substantial plugs. All Siamese inlet connections shall be recessed in the wall or otherwise substantially protected.
 - f. *Outlets* - All dry standpipes shall extend from the ground floor to and over the roof and shall be equipped with a 63 millimeters outlet nor more than 1.20 meters above the floor level at each storey. All dry standpipes shall be equipped with a two-way 63 millimeters outlet above the roof. All outlets shall be equipped with gate valves.
 - g. *Signs* - An iron or bronze sign with raised letters at least 25 millimeters high shall be rigidly attached to the building adjacent to all Siamese connections and such signs shall read: "CONNECTION TO DRY STANDPIPE".
3. *Wet Standpipes* - Every Group H and I Occupancy of any height, and every Group C Occupancy of two (2) more storeys in height, and every Group B, D, E, F and G Occupancy of three (3) or more storeys in height and every Group G and E Occupancy over 1800 sq. meters in area shall be equipped with one or more interior wet standpipes extending from the cellar or basement into the topmost storey; *Provided*, that Group H buildings having no stage and having a seating capacity of less than five hundred (500) need **not** be equipped with interior wet standpipes.
- a. *Construction* - Interior wet standpipes shall be constructed of the same materials as those required for dry standpipes.
 - b. *Size*
 - i. Interior wet standpipes shall have an internal diameter sufficient to deliver 190 liters of water per minute under 2.00 kilograms per square centimeter pressure at the hose connections. Buildings of Group H and I Occupancy shall have wet standpipes systems capable of delivering the required quantity and pressure from any two (2) outlets simultaneously; for all other Occupancies only one (1) outlet need be figured to be opened at one time. In no case shall the internal diameter of a wet standpipe be less than 50 millimeters, except when the standpipe is attached to an automatic fire-extinguishing system.
 - ii. Any approved formula which determines pipe sizes on a pressure drop basis may be used to determine pipe size for wet standpipe systems. The **Building Official** may require discharge capacity and pressure tests on completed wet standpipe systems.
 - c. *Number required* - The number of wet standpipes when required in the Code shall be so determined that all portions of the building are within 6.00 meters of a nozzle attached to a hose 23.00 meters in length.
 - d. *Location* - In Group H and I Occupancies, outlets shall be located as follows: one (1) on each side of the stage, one (1) at the rear of the auditorium, and one (1) at the rear of the balcony. Where occupant loads are less than five hundred (500) the above requirements may be

- waived; *Provided*, that portable fire extinguishers of appropriate capacity and type are installed within easy access from the said locations. In Group B, C, D, E, F and G Occupancies, the location of all interior wet standpipes shall be in accordance with the requirement for dry standpipes; *Provided*, that at least one (1) standpipe is installed to cover not more than 650 sq. meters.
- e. *Outlets.* **All** interior wet standpipes shall be equipped with a 38 millimeter valve in each storey, including the basement or cellar of the building, and located not less than 300 millimeters nor more than 1.20 meters above the floor.
 - f. *Threads.* All those threads used in connection with the installation of such standpipes, including valves and reducing fittings shall be uniform with that prescribed by the Secretary.
 - g. *Water Supply.* All interior wet standpipes shall be connected to a street main not less than 100 millimeters in diameter, or when the water pressure is insufficient, to a water tank of sufficient size as provided in subparagraph (h). When more than one (1) interior wet standpipe is required in the building, such standpipe shall be connected at their bases or at their tops by pipes of equal size.
 - h. *Pressure and Gravity Tanks* – Tanks shall have a capacity sufficient to furnish at least 1,500 liters per minute for a period of not less than 10 minutes. Such tanks shall be located so as to provide not less than 2 kilograms per square centimeter pressure at the topmost base outlet for its entire supply. Discharge pipes from pressure tanks shall extend 50 millimeters into and above the bottom of such tanks. All tanks shall be tested in place after installation and proved tight at a hydrostatic pressure 50% in excess of the working pressure required. Where such tanks are used for domestic purposes the supply pipe for such purposes shall be located at or above the center line of such tanks. Incombustible supports shall be provided for all such supply tanks and not less than a 900 millimeters clearance shall be maintained over the top and under the bottom of all pressure tanks.
 - i. *Fire pumps.* Fire pumps shall have a capacity of not less than 1,000 liters per minute with a pressure not less than 2 kilograms per square centimeter at the topmost hose outlet. The source of supply for such pump shall be a street water main of not less than 100 millimeters diameter or a well or cistern containing a one-hour supply. Such pumps shall be supplied with an adequate source of power and shall be automatic in operation.
 - j. *Hose and Hose Reels* - Each hose outlet of all interior wet standpipes shall be supplied with a hose not less than 38 millimeters in diameter. Such hose shall be equipped with a suitable brass or bronze nozzle and shall be not over 23.00 meters in length. An approved standard form of wall hose reel or rack shall be provided for the hose and shall be located so as to make the hose readily accessible at all times and shall be recessed in the walls or protected by suitable cabinets.
4. *Basement Pipe Inlets* - Basement pipe inlets shall be installed in the first (1st) floor of every store, warehouse, or factory where there are cellars or basements under same; *Except*, where in such cellars or basements there is installed a fire-extinguishing system as specified in the **Code** or where such cellars or basements are used for banking purposes, safe deposit vaults, or similar uses.
 - a. *Material* - **All** basement pipe inlets shall be of cast iron, steel, brass, or bronze with lids of cast brass or bronze and shall consist of a sleeve not less than 200 millimeters in diameter through the floor extending to and flush with the ceiling below and with a top flange, recessed with an inside shoulder, to receive the lid and flush with the finished floor surface. The lid shall be a solid casting and shall have a ring lift recessed on the top thereof, so as to be flushed. The lid shall have the words "FOR FIRE DEPARTMENT ONLY, DO NOT COVER UP" cast on the top

- thereof. The lid shall be installed in such a manner as to permit its removal readily from the inlet.
- b. *Location*. Basement pipe inlets shall be strategically located and kept readily accessible at all times to the Fire Department.
5. *Approval* - All fire-extinguishing systems, including automatic sprinklers, wet and dry standpipes, automatic chemical extinguishers, basement pipe inlets, and the appurtenances thereto shall meet the approval of the Fire Department as to installation and location and shall be subject to such periodic test as it may require.

SECTION 1213. Stages and Platform

1. *Stage Ventilators* - There shall be one (1) or more ventilators constructed of metal or other incombustible material near the center and above the highest part of any working stage raised above the stage roof and having a total ventilation area equal to at least 5% of the floor area within the stage walls. The entire equipment shall conform to the following requirements:
 - a. *Opening Action* - Ventilators shall open by spring action or force of gravity sufficient to overcome the effects of neglect, rust, dirt, or expansion by heat or warping of the framework.
 - b. *Glass* - Glass, if used in ventilators, must be protected against falling on the stage. A wire screen, if used under the glass, must be so placed that if clogged it cannot reduce the required ventilating area or interfere with the operating mechanism or obstruct the distribution of water from the automatic fire extinguishing systems.
 - c. *Design* - Ventilators, penthouses, and supporting framework shall be designed in accordance with the Code.
 - d. *Spring Actuation* - Springs, when employed to actuate ventilator doors, shall be capable of maintaining full required tension indefinitely. Springs shall not be stressed more than 50% of their rated capacity and shall not be located directly in the air stream, nor exposed to elements.
 - e. *Location of Fusible Links* - A fusible link shall be placed in the cable control system on the underside of the ventilator at or above the roof line or as approved by the Building Official, and shall be so located as not to be affected by the operation of fire-extinguishing systems.
 - f. *Control* - Remote, manual or electrical control shall provide for both opening and closing of the ventilator doors for periodic testing and shall be located at a point on the stage designated by the Building Official. When remote control of ventilator is electrical, power failure shall not affect its instant operation in the event of fire. Hand winches may be employed to facilitate operation of manually controlled ventilators.
2. *Gridirons* -
 - a. Gridirons, fly galleries, and pin-rails shall be constructed of incombustible materials and fire protection of steel and iron may be omitted. Gridirons and fly galleries shall be designed to support a live load of not less than 367 kilograms per sq. meter. Each loft block well shall be designed to support 373 kilograms per linear meter and the head block well shall be designed to support the aggregate weight of all the loft block wells served. The head block well must be provided with an adequate strongback or lateral brace to offset torque.
 - b. The main counterweight sheave beam shall be designed to support a horizontal and vertical uniformly distributed live load sufficient to accommodate the weight imposed by the total

- number of loft blocks in the gridiron. The sheave blocks shall be designed to accommodate the maximum load for the loft or head blocks served with a safety factor of five (5).
3. *Rooms Accessory to Stage* - In a building having a stage, the dressing room sections, workshops, and storerooms shall be located on the stage side of the proscenium wall and shall be separated from each other and from the stage by not less than a One-Hour Fire-Resistive Occupancy Separation.
 4. *Proscenium Walls* - A stage shall be completely separated from the auditorium by a proscenium wall of not less than two-hour incombustible construction. The proscenium wall shall extend not less than 1.20 meters above the roof over the auditorium. Proscenium walls may have, in addition to the main proscenium openings, one (1) opening at the orchestra pit level and not more than two (2) openings at the stage floor level, each of which shall be not more than 2.00 sq. meters in area. All openings in the proscenium wall of stage shall be protected by a fire assembly having a one and one-half - hour fire-resistive rating. The proscenium opening, which shall be the main opening for viewing performances, shall be provided with a self-closing fire-resistive curtain as specified in the **Code**.
 5. *Stage Floor* - The type of construction for stage floors shall depend upon the requirements based on the Type of Occupancy and the corresponding fire-resistive requirements. All parts of the stage floor shall be designed to support not less than 620 kilograms per square meters. Openings through stage floors shall be equipped with tight-fitting trap doors of wood of not less than 50 millimeters nominal thickness.
 6. *Platforms* - The type of construction for platforms shall depend upon the requirements based on the Type of Occupancy and corresponding fire-resistive requirements. Enclosed platforms shall be provided with one (1) or more ventilators conforming to the requirements of stage ventilators; *Except*, that the total area shall be equal to 5% of the area of the platform. When more than one (1) ventilator is provided, they shall be so spaced as to provide proper exhaust ventilation. Ventilators shall not be required for enclosed platforms having a floor area of 45.00 sq. meters or less.
 7. *Stage Exits* - At least one (1) exit not less than 900 millimeters wide shall be provided from each side of the stage opening directly or by means of a passageway not less than 900 millimeters in width to a street or exit court. An exit stair not less than 750 millimeters wide shall be provided for egress from each fly gallery. Each tier of dressing rooms shall be provided with at least two (2) means of egress each not less than 750 millimeters wide and all such stairs shall be constructed in accordance with the requirement specified in the Code. The stairs required in this Sub-section need not be enclosed.

SECTION 1214. Motion Picture Projection Rooms

1. *General Requirements* - The provisions of this Section shall apply only where ribbon type motion picture films in excess of 22-millimeter width and electric projection equipment are used. Every motion picture machine using ribbon type film in excess of 22 millimeter width and electric arc projections equipment, together with all electrical devices, rheostats, machines, and all such films present in any Group C, I, or H Occupancy, shall be enclosed in a projection room large enough to permit the operator to walk freely on either side and back of the machine.
2. *Construction* - Every projection room shall be of not less than one-hour fire-resistive construction throughout and the walls and ceiling shall be finished with incombustible materials. The ceiling shall be not less than 2.40 meters from the finished floor. The room shall have a floor area of not less than 7.00 sq. meters and 3.50 sq. meters for each additional machine.
3. *Exit* - Every projection room shall have at least two doorways separated by not less than one-third the perimeter of the room, each at least 750 millimeters wide and 2.00 meters high. All entrances

to a projection room shall be protected by a self-closing fire assembly having a three-fourth - hour fire-resistive rating. Such doors shall open outward and lead to proper exits as required in the Code and shall not be equipped with any latch. The maximum width of such door shall be 750 millimeters.

4. *Ports and Openings* - Ports in projection room walls shall be of three (3) kinds: projection ports; observation ports; and combination ports used for both observation and for stereopticon, spot or floodlight machines.
 - a. *Ports Required* - There shall be provided for each motion picture projector not more than one (1) projection port, which shall be limited in area to 750 sq. centimeters, and not more than one (1) observation port, which shall be limited in area to 1,300 sq. centimeters. There shall be not more than three (3) combination ports, each of which shall not exceed 750 millimeters by 600 millimeters. Each port opening shall be completely covered with a pane of glass; *Except*, that when acetate safety film is used, projection ports may be increased in size to an area not to exceed 4,500 sq. centimeters.
 - b. *Shutters* - Each port and every other opening in projection room walls, including, any fresh-air inlets but excluding exit doors and exhaust ducts, shall be provided with a shutter of not less than 2.4 millimeters thick sheet metal or its equivalent large enough to overlap at least 25 millimeters on all sides of such openings. Shutters shall be arranged to slide without binding in guides constructed of material equal to the shutters in strength and fire-resistance. Each shutter shall be equipped with a 74° fusible link, which when fused by heat will cause closure of the shutter by gravity. Shutters of a size greater than 1,300 sq. centimeters shall be equipped with a counter-balance. There shall also be a fusible link located over the upper magazine of each projector, which upon operating, will close all the shutters. In addition, there shall be provided suitable means for manually closing all shutters simultaneously from any projector head and from a point within the projection room near each exit door. Shutters on openings not in use shall be kept closed; *Except*, that shutters may be omitted when only acetate safety film is used.
5. *Ventilation*
 - a. *Inlet* - A fresh-air inlet from the exterior of the building not less than 900 sq. centimeters and protected with wire netting, shall be installed within 50 millimeters of the floor in every projection room, the source of which shall be remote from other outside vents or flues.
 - b. *Outlets* - Ventilation shall be provided by one (1) or more mechanical exhaust systems which shall draw air from each arc lamp housing to out-doors either directly or through an incombustible flue used for no other purpose. Exhaust capacity shall not be less than 0.50 cu. meter nor more than 1.40 cu. meter per minute for each arc lamp plus 5.60 cu. meters for the room itself. Systems shall be controlled from within the enclosure and shall have pilot lights to indicate operation. The exhaust systems serving the projection room may be extended to cover rooms associated therewith such as rewind rooms. No dampers shall be installed in such exhaust systems. Ventilation of these rooms shall not be connected in any way with ventilating or air-conditioning systems serving other portions of the building. Exhaust ducts shall be of incombustible material and shall either be kept 25 millimeters from combustible material or covered with 10 millimeters of incombustible heat-insulating material.
6. *Regulation of Equipment* - All shelves, fixtures, and fixed equipment in a projection room shall be constructed of incombustible materials. All films not in actual use shall be stored in metal cabinets having individual compartments for reels or shall be in generally accepted shipping containers. No solder shall be used in the construction of such cabinets.

SECTION 1215. Lathing, Plastering, and Installation of Wall Boards

The installation of lath, plaster and gypsum wall board shall conform to the fire-resistive rating requirements and the type of construction of building.

(emphases and underscoring supplied)
Rule XIII follows