

PART IV
Chapter 2
Precautionary Requirements

2.1 Occupancy Classification

All buildings shall be classified according to their use or by considering the character of their occupancy. For the purpose of this Code, the occupancy classification groups shall be as follows:

Occupancy A:	Residential
Occupancy B:	Educational
Occupancy C:	Institution for care
Occupancy D:	Health Care
Occupancy E:	Business
Occupancy F:	Mercantile
Occupancy G:	Industrial
Occupancy H:	Storage
Occupancy I:	Assembly
Occupancy J:	Hazardous
Occupancy K:	Garages
Occupancy L:	Utilities
Occupancy M:	Miscellaneous

The details of occupancy classification of buildings are provided in Part 3 of this Code.

2.2 Classification of Construction Types

For the purpose of this Code, every room or control area or space of a building or a building itself hereafter altered or erected shall be classified in one specific type of construction as grouped as follows:

GROUP I- Non-combustible, subdivided as follows:

Type- I A	4 hour protected
Type- I B	3 hour protected
Type- I C	2 hour protected
Type- I D	1 hour protected
Type- I E	Unprotected

GROUP II- Combustible, subdivided as follows:

Type- II A	Heavy timber
Type- II B	Protected wood joist
Type- II C	Unprotected wood joist
Type- II D	Protected wood frame
Type- II E	Unprotected wood frame

The types of construction are based on fire resistance of construction elements, which are detailed in Part 3 of this Code.

2.3 Fire Zones

The development areas of a city, township or municipality or union shall be divided into Fire zones as distinct areas based on the inherent fire hazards of the buildings to be constructed and the degree of safety desired for the occupancy group accommodated therein.

2.4 Mixed or Separated or Detached Occupancy

Where two or more occupancy types are amalgamated in a floor or in a building shall be designated as mixed occupancy shall be allowed as per provisions of A-Z list of Part 3 and this Code.

Where two or more occupancy types are in groups in a floor or in a building and separated as specified in the Table 3.2.1 of Part 3 and as per provisions of this Code shall be designated as separated Occupancy.

Hazardous occupancy J shall not be allowed as mixed or separated occupancy with any other occupancy classification as per provisions of this Code.

Building structures are isolated by fire separation distances as per provision of this Code shall be designated as detached occupancies.

2.5 Openings In Separation Wall

Opening means a hole or an aperture in the building envelope or in any wall within the building through which air can pass. Protective type opening means a hole or an aperture shall have open able closures with fire resistive assemblies to restrict air movement.

Separation wall not constructed monolithically or homogeneously and having joints shall be complied with requirements of smoke lock and fire resistance rating as per provisions of this Code.

Vertical solid elements which create a barrier within a space or create a building envelope shall be designated as wall or partitions as per provisions of this Code.

- (a) The openings in occupancy separation wall shall conform to the provisions set forth in the Part 3 of this Code.
- (b) Openings in fire separating walls and floors shall not exceed the approved limit and the opening shall be of protective type and conform to the approved provisions of this Code.
- (c) Fire separation walls shall not have opening exceeding 11.2 m^2 in area and the aggregate width of all openings at any floor level shall not exceed 25 percent of the length of the wall. When an entire storey floor area has fire separation walls on two opposite sides have openings shall be covered by automatic fire suppression system, the maximum allowable opening may be doubled with a minimum distance of 0.9 m between adjacent openings.
- (d) Each protected openings in a fire separation wall shall be limited to 5.6 m^2 in area with a maximum height of 2.75 m and width of 2.20 m. Wall or floor openings shall be protected with approved fire resisting means conforming to approve standards as per provision of this Code. When openings in floors have protected enclosures or have enclosure walls which form a shaft and have openings on enclosure wall shall be protected by fire assemblies.
- (e) Openings of service lines like cables, electrical wirings, telephone cables, plumbing fixture etc. shall be protected by enclosures having an approved fire resistance rating. Medium or low voltage electrical wire running through shaft or ducts shall be either armoured or cased within metal conduits as per provisions of Part 8 of this Code.
- (f) All openings in the fire separation walls shall be protected with fire resistance assemblies or automatic fire suppression system as per provisions of this Code.

2.6 Smoke and Heat Vents

Interior or indoor air qualities are maintained as good as natural outdoor air qualities as per provisions of this Code through openings in the building envelope shall be designated as Natural Ventilation.

Interior or indoor air qualities are maintained by the means of mechanical devices shall be designated as Mechanical Ventilation. Restricted ventilation means excessive smoke accumulation within a building during fire.

- (a) Smoke and heat vents shall be installed in areas of restricted ventilation such as windowless buildings, underground structures, and factories floor spaces of restricted ventilation.
- (b) Where exit access travel distance is more than 23 m, smoke and heat vents shall be constructed in accordance with the provisions of this Code.
- (c) The vent area and spacing of the vents shall comply with Table 4.2.1.
- (d) Closures of natural draft, smoke and heat vents shall be installed in such a way that fire service personnel can open it easily during a fire.
- (e) Smoke and heat vents on roof or ceiling or wall shall normally be kept open. In case of closed vents, automatic activation of the openings by heat responsive device rated at 38° C to 104° C above ambient shall be a requirement. The releasing mechanism shall be capable of opening the vent fully when the vent is exposed to a time-temperature gradient that reaches an air temperature of 260° C within 5 minutes. The vents shall also be capable of being opened by manual operation.
- (f) Fire Vents requirements for Industrial and Storage Buildings are given in Appendix B of Part 4.

Table 4.2.1: Smoke and Heat Vent Size and Spacing

Use group	Hazard Condition	Vent Area to Floor Area Ratio	Max Spacing of Vent Centres
Occupancy H1	Low Hazard	1:150	45 m
Occupancy H2	Moderate Hazard	1:100	36 m
Occupancy J1	High Hazard	1:30 to 1:50	22.5 m to 30 m
Occupancy J2, J3, J4	High Hazard	1:30 to 1:50	22.5 m to 30 m
Occupancy K1, K3	Low Hazard	1:150	45 m

2.7 Electrical, Gas and Hvac Services

The requirements of the electrical, HVAC and gas services shall meet the provisions of Part 8 of this Code.

- (a) Air-conditioning and ventilation systems shall be installed and maintained as per provisions of this Code so that the fire, fumes or smoke do not spread from one area of fire to other area of a building through the ducts or vents.
- (b) Properly designed fire dampers shall be installed within the air-conditioning and ventilation ducts, which shall automatically close the flow of air in case of fire.
- (c) For large assembly areas, department stores and hotels with more than 100 rooms in a single block, effective means for preventing circulation of smoke through the air-conditioning ducts shall be installed. Such means shall consist of approved smoke sensing control devices, where fuses of dampers may not function during early state of a fire due to insufficient heat as per provisions of this Code.

2.8 Surface Finishes

Materials used to trim or cover the interior and the exterior surfaces of a building have the potential of generating smoke and toxic fumes during a fire and have the potentiality of changing the nature of fire due to its ignitability as fuel. Use of such finish materials shall be classified as per provisions of this Code.

- (a) The fire susceptibility of various types of surface finishes shall be determined in terms of the rate of spread of fire (ASTM E 84). Based on the rate of spread of fire, the surface finish materials shall be classified into three (3) classes:

Class I	Surfaces of low flame spread: Flame does not effectively spread more than 300 mm in the first 1.5 minutes with an ultimate value of 600 mm.
Class II	Surfaces of medium flame spread: Flame does not spread effectively more than 300 mm and 850 mm in the first 1.5 minutes and 10 minutes respectively.
Class III	Surfaces of rapid flame spread: Flame spreads effectively more than 300 mm and 850 mm in the first 1.5 minutes and 10 minutes respectively.
- (b) Interior finish of walls and ceilings shall have a flame spread rating not greater than those in Table 4.2.2 for various occupancy classes.

Table 4.2.2: Acceptable Flame Spread Rating Classes of Interior Finish

Occupancy Class/Use Group		Vertical Exits and Passage Ways	Corridors Providing Exit Access	Rooms or Enclosed Areas
A1	Detached single family dwelling	III	III	III
A2	Two family dwelling	I	I	II
A3	Flats or Apartment	I	I	I
A5	Hotels and Lodging Housing	I	I	I
B	Educational	I	I	I
C1, C2	Institutional, Residential & custodial	I	I	III
C3	Institutional-Incapacitated	I	I	I
C4	Institutional- Restrained	I	I	I
D	Health Care	I	I	I
E	Business	I	II	II
F	Mercantile	I	II	II
G	Industrial	I	II	II
H	Storage	III	II	III
I1	Large assembly with fixed seats	I	I	I
I2	Small assembly with fixed seats	I	I	I
I3	Large assembly without fixed seats	I	I	I
I4	Small assembly without fixed seats	I	I	I
J	Hazardous	I	II	III

Note: Class III may be adopted Instead of Class II where the area is covered by automatic fire suppression system.

2.9 Glazing Assemblies

- (a) Buildings of construction shall use any one of the following types of glazing using wire glass by electro-copper or equivalent. Building of construction types as designated as unprotected or combustible may use hardwood sashes or frames or both.
- (b) Glazing system used partially or as a whole to fulfill fire separations or fire barriers requirements as per provisions of this Code shall be the equivalent of required fire resistance rating. Glazed doors, windows or partitions or wall with appropriate smoke lock along with other safety due to fragility, translucency or transparency shall be correctly installed. Such fire-resistant glazing assembly must function as an integral system together with the frame, beads, bead fixings, glazing materials and frame fixings all working together with compatibilities with the standards installation as per provisions of this Code.
- (c) Wired glass panels shall comply with the following requirements:
 - (i) Thickness of the glass shall not be less than 6 mm.
 - (ii) Embedded wire netting mesh in the glass shall not be more than 25 mm mesh.
 - (iii) The sashes or frames or both shall be entirely made up of iron or any other approved metal. The frame shall be securely fixed into the wall (except panels of internal doors).
 - (iv) Setting of the panels of glass shall be achieved by rebates or grooves of not less than 6 mm diameter/width or depth keeping due allowance for expansion. The glass shall be secured to the frame by hard metal fastenings. Approved sealants may be used for weather proofing.
 - (v) Where wired glass panels are labelled as protective openings, they shall conform to the size limitations shown in the Table 4.2.3.

Table 4.2.3: Limitations of Wired Glass Panel sizes in Protective openings

Required Fire Resistance Rating	Opening Size		
	Max Height (m)	Max Width (m)	Max Area (m ²)
3 hours	NP	NP	NP
1½ hour door in exterior walls	NP	NP	NP
1½ hour fire rating	0.85	0.25	0.065
¾ hour fire rating	1.4	1.4	0.85
Fire windows	1.4	1.4	0.85

Note: Size limitations are not applicable for Fire Rated Glazing Assemblies.

NP = Not Permitted.

- (d) Electro-copper glazing shall comply with the following requirements:
 - (i) Thickness of the glass shall not be less than 6 mm.
 - (ii) Not more than 0.4 m² of square glass shall be formed by electro-copper glazing in sectional lights.
 - (iii) The sashes or frames or both shall be entirely made up of iron or any other approved metal. The frame shall be securely bolted into the wall (except panels and internal doors).
 - (iv) Setting of the panels of glass shall be achieved by rebates or grooves of not less than 6 mm width or depth keeping due allowance for expansion. The glass shall be secured to the frame by hard metal fastenings. Approved sealants may be used for weather proofing.
- (e) Wall opening more than 5 m² shall not be deemed to be effectively protected by wired glass or electro-copper glazing.
- (f) Wired glass or electro-copper glazing not exceeding 0.85 m² in area shall be allowed provided it is cased in hard metal and secured to the frames by hard metal hinges not exceeding 60 mm apart and by fastening at top, centre and bottom.

2.10 Skylights

- (a) Wired glasses used in skylights shall comply with the following requirements:
 - (i) Thickness of the glass shall not be less than 6 mm;
 - (ii) Wire netting mesh embedded in the glass shall not be more than 25 mm square;
 - (iii) The glazing shall be caged in frame of continuous metal divided by bars 750 mm apart centre to centre. The frame and bars shall be iron or other approved metal (or of hard wood covered with sheet metal). The glass shall be secured to the frame by hard metal fastenings. Approved sealants may be used for weather proofing.
- (b) Single opening for Skylight more than 5 m² shall not be deemed to be effectively protected by wired glass.

2.11 Fire Lifts

- (a) Fire lifts shall be installed as per provisions of this Code. Fire lifts, where installed shall be fully automated from the ground level with all though fire rated and protected wiring and switches and shall have a minimum capacity of 8 persons.
- (b) Fire lifts shall be operated and maintained by the inmates of building except during fire. During fire, Firemen shall takeover to operate such lifts.
- (c) Fire lifts shall be equipped with approved two way voice communication with the fire command station or control room or security room on the exit termination level of a building.
- (d) Number and location of fire lifts in a building shall be decided on the basis of total occupant load, floor area and compartment.
- (e) A Lift shaft or bank shall be dedicated to Fire lift.
- (f) The speed of the lift shall be such that it can reach the top floor from ground level (non-stop) within 1 minute.
- (g) Smoke detectors shall be installed at a distance of 3m from every entry doors of Fire Lifts and links with corresponding lift control panel to prevent lift doors to open in case of fire at any level.
- (h) All lifts in tall structure shall be operable during fire. There shall be provisions for firemen to take over the control of lift operation as per provision of this Code.
- (i) All stretcher and hospital lifts shall be operable during fire. There shall be provisions for firemen to take over the control of lift operation as per provision of this Code.
- (j) Lifts installed for accessibility shall be operable during fire. There shall be provisions for firemen to take over the control of lift operation as per provision of this Code.
- (k) Lift lobby shall be connected with at least one fire stair by a means of exit component.

2.12 Utilities (Occupancy L) and Exempted Quantities of Hazardous Material

Occupancy type L is a separated occupancy from the main occupancy classifications to provide ancillary electro-mechanical service facilities require a special attention which shall be taken as per provision of this Code. Utilities (Occupancy L) and exempted quantities of hazardous materials for different occupancies are given below:

2.12.1 Occupancy A: Residential

- (i) Flammable liquids used for domestic purposes shall be kept adequately sealed in approved containers within the limit of exempted quantity at all times.
- (ii) Stoves and heaters using open flame shall be so located at defined space with proper precaution.
- (iii) Exhaust fans used in kitchens shall be placed on a peripheral wall of the building or to a duct connected directly to outside and shall be made of non-combustible material. The duct shall not pass through combustible materials.
- (iv) Doors leading into a room containing flammable liquids shall be provided with self-closing devices. Appropriate signs identifying the storage materials and requesting the users to keep the door closed shall be marked on both sides of the door.
- (v) All outdoor roof top antennas shall be protected by proper lightning arrester.
- (vi) Rooms containing boiler shall be separated from the main building by appropriate separation wall with all its openings protected as per provisions detailed in Sec 2.3 of Part 3 and Sec 2.5 of this Chapter.
- (vii) Areas or rooms within the building identified as Control Area shall be protected or segregated by appropriate separation wall or by other approved means as per the provisions of this Code.

2.12.2 Occupancy B: Educational

- (i) Control areas containing volatile flammable liquids shall be separated from the adjoining areas in as per provisions of this Code.

- (ii) Gas pipeline entering any building shall be equipped with shutoff valves outside the building with conspicuous marking clearly delineating the location as per provisions of Part 8 of this Code.
- (iii) The openings of boiler rooms shall be adequately protected by fixed, automatic or self-closing fire assemblies.

2.12.3 Occupancy C: Institutional

Permit shall not be granted for storage or handling of any hazardous material even in control areas, except for normal use in amounts not exceeding the exempted amounts specified in Chapter 2 of Part 3, in a building or part thereof classified as Occupancy C.

2.12.4 Occupancy D: Health Care

Storage of volatile flammable liquids such as chloroform, ethyl alcohol, mentholated spirit etc. shall be stored in Control Areas and no unauthorized person shall be allowed to handle such liquids.

2.12.5 Occupancy E: Business

- (i) Exit aisles or approaches in self-service in a space shall not be obstructed by placing checkout stand with associated railings or barriers on its passage.
- (ii) All operations in open air markets, refuelling stations, road side stands for sale of farm products etc. shall be so conducted that unobstructed access to exits are always maintained.

2.12.6 Occupancy F: Mercantile

Provisions are same as those of Sec 2.12.5 (Occupancy E).

2.12.7 Occupancy G: Industrial

- (i) Apparatus are not capable to igniting flammable vapour shall be permitted within a control area of a building using or processing or storing volatile flammable liquid. Control Areas of a building using or processing or storing such flammable liquid shall be covered by exhaust ventilation system.
- (ii) Boiler rooms and areas containing heating plants shall be separated from the rest of the occupancy as per provisions of this Code.
- (iii) Adequate protective measures shall be taken against hazards associated with distribution and use of electricity and gas in accordance with the provisions of Chapters 2 and 8 of Part 8.
- (iv) The machine layout shall be congenial to safe fire practice.

2.12.8 Occupancy H: Storage

- (i) Apparatus are not capable to igniting flammable vapour shall be permitted within a Control area or part of a building using or storing volatile flammable liquid. Control Areas of a building using or storing such flammable liquid shall be covered by exhaust ventilation system.
- (ii) Boiler rooms and areas containing heating plants shall be effectively segregated from the main occupancy.
- (iii) Adequate protection shall be taken against hazards associated with distribution and use of electricity and gas in accordance with the provisions of Chapters 2 and 8 of Part 8.

2.12.9 Occupancy I: Assembly

- (i) All materials used for decorative purposes in buildings of Occupancy I shall be non-combustible. If fabrics and papers are used for decorative purposes, shall be treated with flame resistant chemicals/materials.
- (ii) Rooms and parts of a building containing high pressure boilers, refrigerating machinery, large transformer or other service equipment having explosion potential shall not be located on or adjacent to the defined exit route. Such rooms shall be effectively cut off from the rest of the building and connected to open air through approved ducts or openings.
- (iii) Rooms or parts of a building used for storage of combustible materials such as paints or other items shall be effectively cut off from main assembly building or protected by approved automatic sprinkler system. Such areas shall be away from staircases.
- (iv) Legitimate stages having such facilities as fly galleries, gridirons and rigging shall be covered by an automatic sprinkler system above and below such stage areas or spaces. Auxiliary spaces such as dressing rooms, store rooms, and workshops and the proscenium opening shall be effectively covered by fire resistant curtains capable of withstanding a lateral pressure of 4 kN/m². The curtain shall be equipped with self-closing emergency device and when closed shall be tight enough to prevent spread of smoke.
- (v) Legitimate stage roof above every theatre using movable scenery or motion picture screen constructed of highly combustible materials shall be fitted with ventilators in or above it. The ventilators shall be operable from the stage

floor manually or by fusible links or some approved automatic heat actuated device to give an opening to sky with an area of one-eighth the area of the stage.

- (vi) In theatres not protected by automatic fire sprinklers, the proscenium wall using movable scenery or decorations shall be provided with maximum of two openings to enter the stage and each opening shall not be of more than 2 m².
- (vii) Film projection apparatus shall be enclosed within fire resistant enclosures.
- (viii) Auditoriums of theatres and cinemas shall be installed with vents on roof having vent area equal to the floor area including balconies and galleries, boxes and tiers. Larger numbers of smaller vents shall be preferable over smaller number of larger vents.

2.12.10 Occupancy J: Hazardous

- (i) Equipment and machinery in operations, igniting and/or emitting combustible volatile substances shall be installed in a standard environment as recommended in NFPA or equivalent standards.
- (ii) Rooms containing boiler or heating plant shall be effectively separated from the main occupancy.

2.12.11 Occupancy K: Garage

As per safety requirement of NFPA or equivalent standard.

2.12.12 Occupancy L: Utility

As per safety requirement of NFPA or equivalent standard.

2.12.13 Occupancy M: Miscellaneous Buildings

As per safety requirement of NFPA or equivalent standard.

2.13 RELATED APPENDIX

Appendix B Fire Protection Considerations for Venting in Industrial and Storage Building.

PART IV
Chapter 3
Means of Egress

3.1 scope

The provisions of this Section shall control the design, construction and arrangement of building components to provide a reasonably safe means of egress. Any repair or alteration works within a building shall be prohibited unless the existing means of egress and fire protection system are continuously maintained or a continuous alternative exits and protection measures are taken to provide an equivalent degree of safety for the occupant and the workers for the total duration of such project.

3.2 Components of Means of Egress

3.2.1 A means of egress is an evacuation system with the provisions of reentry for rescuers and fire fighters where a continuous and unobstructed way of exit travel shall be provided from any point within a building to a designated area of refuge for allowable delayed evacuation and ended up with the exit termination by reaching a street abutting building or plot or an safe area which is open to air and designated assemblies for evacuees.

The way of exit travel within a building from any point thereof along a means of egress shall consist of three parts: (1) the exit access, (2) the exit, and (3) the exit discharge

- (a) A way or path of evacuation from any point of an area affected due to fire incident leads to a protected entry to another separated area of a building shall be termed as exit access. Straight line distance between the remotest point of an area of incident and the entrance point of a separated area shall be measured and termed as a travel distance.
- (b) The exit is a component or a group of components start with a protected opening to evacuate an area of fire incidence and provides a safe entry to a separated area which is component of means of egress and subsequently leads to the exit discharge.
- (c) The outer edges or peripheral points of a building from where occupants shall evacuate the building envelope termed as Exit discharges which shall lead evacuees to the terminal points at a safe distance from thereof.

An area or any plot abutting street which is open to air and designated for systematic assemblies of evacuees to complete the process of egress system shall be termed as exit termination.