

PART III
Chapter 3

Classification of Building Construction Types Based on Fire Resistance

3.1 General

3.1.1 Classification by Type of Construction

For the purpose of this Code, every room 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: Noncombustible, subdivision

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

GROUP II: Combustible subdivision

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 fire resistance ratings of various types of construction for structural and non-structural members are specified in Tables 3.3.1 (a) and (b). For hazardous Occupancies involving an exceptionally high degree of fire risk or an exceptionally high concentration of combustible or flammable content, the Authority may increase the requirement of Table 3.3.1 (a).

Buildings having a height of more than 33 m shall be constructed with non-combustible materials.

The fire resistance ratings of various building components shall conform to ASTM standards.

No building or portion thereof shall be designated a given construction type unless it fully conforms to the minimum requirements for that Construction type.

When a type of construction is utilized which is superior than the type of construction required by this Code, there shall be no requirement to upgrade the rest of the construction to comply to that higher type of construction and the designated construction type shall be that of the lesser classification, unless all of the requirements for the higher classification are met.

3.1.2 Group I: Non-Combustible Construction

Buildings or portion thereof in Non-combustible Construction Group I are those in which the walls, exit-ways, shafts, structural members, floors, and roofs are constructed of non-combustible materials and assemblies having fire-resistance ratings specified in Table 3.3.1 (a). The Non-combustible group consists of Construction Type I-A, I-B, I-C, I-D and I-E.

3.1.2.1 Construction Type I-A

This construction type includes buildings in which the bearing walls and other major structural elements are generally of four-hour-fire-resistance rating.

3.1.2.2 Construction Type I-B

This construction type includes buildings in which the bearing walls and other major structural elements are generally of three-hour-fire-resistance rating.

3.1.2.3 Construction Type I-C

This construction type includes buildings in which the bearing walls and other major structural elements are generally of two-hour-fire-resistance rating.

3.1.2.4 Construction Type I-D

This construction type includes buildings in which the bearing walls and other major structural elements are generally of one-hour-fire-resistance rating.

3.1.2.5 Construction Type I-E

This construction type includes buildings in which the bearing walls and other major structural elements generally have no fire-resistance rating.

3.1.3 Group II: Combustible Construction

Buildings or portion thereof in Combustible Construction Group II are those in which the walls, exit-ways, shafts, structural members, floors, and roofs are constructed wholly or partly of combustible materials having fire-resistance ratings specified in Table 3.3.1 (b). The Non-combustible group consists of Construction Type II-A, II-B, II-C, II-D and II-E.

3.1.3.1 Construction Type II-A

This Construction type includes heavy timber construction in which fire-resistance is attained by—

- Limiting the minimum sizes of wood structural members and the minimum thickness and composition of wood floors and roofs;
- Avoiding concealed spaces under floors and roofs or by providing fire-stopping protection for these spaces; and
- Using fastening, construction details, and adhesives for structural members as required by this Chapter and Part 4.
- The minimum dimensions for framing members shall be prescribed in this Chapter and Part 4, except that members are protected to provide a fire-resistance rating of at least one hour need not comply with this requirement.

3.1.3.2 Construction Type II-B

This Construction type includes buildings and portion thereof in which

- Exterior walls, fire walls, exit-ways, and shaft enclosures are of non-combustible materials having the required fire-resistance ratings; and
- The floors, roofs and interior framing are wholly or partly of wood of smaller dimensions than required for type II-A construction, or are of other combustible or non-combustible materials, having the required fire-resistance rating.

Table 3.3.1 (a): Fire Rating for Construction Group I: Non-Combustible

Exterior wall with Fire Separation Distance of	Construction Element Exterior Wall	TYPE -I-A		TYPE -I-B		TYPE -I-C		TYPE -I-D		TYPE -I-E	
		Ratings in Hours	Exterior Opening ^{a,b}	Ratings in Hours	Exterior Opening ^{a,b}	Ratings in Hours	Exterior Opening ^{a,b}	Ratings in Hours	Exterior Opening ^{a,b}	Ratings in Hours	Exterior Opening ^{a,b}
0.9m or less	Bearing	4	N.P	3	N.P	2	N.P	2	N.P	2	N.P
	Non-bearing ^f	2		2		2		2		2	
More than 0.9m but less than 4.5m	Bearing	4	as per provisions of this Code	3	as per provisions of this Code	2	as per provisions of this Code	2	as per provisions of this Code	2	as per provisions of this Code
	Non-bearing ^f	2		2		2		2		2	
4.5m or more but less than 9.0m	Bearing	4	as per provisions of this Code	3	as per provisions of this Code	2	as per provisions of this Code	1	as per provisions of this Code	0	as per provisions of this Code
	Non-bearing ^f	1½		1½		1		1		0	

Exterior wall with Fire Separation Distance of	Construction Element Exterior Wall	TYPE -I-A		TYPE -I-B		TYPE -I-C		TYPE -I-D		TYPE -I-E	
		Ratings in Hours	Exterior Opening ^{a,b}	Ratings in Hours	Exterior Opening ^{a,b}	Ratings in Hours	Exterior Opening ^{a,b}	Ratings in Hours	Exterior Opening ^{a,b}	Ratings in Hours	Exterior Opening ^{a,b}
9.0m or more	Bearing	4	N.L	3	N.L	2	N.L	1	N.L	0	N.L
	Non-bearing ^f	0		0		0		0		0	
Interior bearing walls and bearing partitions		4		3		2		1		0 ^{g,i}	
Enclosure of vertical exits ^e , exit passageways, hoistways and shafts		2		2		2		2		2	
Fire divisions and fire barrier Walls or partitions or ceiling slab		See Table 3.2.1 and provisions of this Code									
Columns ^k , girders, trusses (other than roof trusses) and framing	Supporting one floor	3		2		1½		1		0 ^{g,i}	
	Supporting more than one floor ^l	4		3		2		1		0 ^{g,i}	
Structural members supporting walls		Structural members shall have the same fire resistance rating of wall to be supported, but not less than rating required by the construction classification.									
Floor construction including beams		3		2		1½		1		0 ^{g,i}	
Roof construction, including beams, trusses and framing including arches, domes, shells, cable supported roofs and roof decks ^h	4.5m or less in height above floor to lowest member of ceiling	3		1½		1 ⁱ		1 ⁱ		0 ^{g,i}	
		2 ^{c,i} or 1 ^{d,i}		1½ ^{c,i} or 1 ^{d,i}		1 ⁱ		1 ⁱ		0 ^{g,i}	
	6m or more in height above floor to lowest member of ceiling	2 ^{c,i} or 0 ^{d,g,i}		1½ ^{c,i} or 1 ^{d,g,i}		1 ^{c,i} or 0 ^{d,g,i}		1 ^{c,i} or 0 ^{d,g,i}		0 ^{g,i}	

Exterior wall with Fire Separation Distance of	Construction Element Exterior Wall	TYPE -I-A		TYPE -I-B		TYPE -I-C		TYPE -I-D		TYPE -I-E	
		Ratings in Hours	Exterior Opening ^{a,b}	Ratings in Hours	Exterior Opening ^{a,b}	Ratings in Hours	Exterior Opening ^{a,b}	Ratings in Hours	Exterior Opening ^{a,b}	Ratings in Hours	Exterior Opening ^{a,b}
Shafts (other than exits) and elevator hoistways		2		2		2		2		2	
Fire separation wall and party wall		4		2		2		2		2	
Access corridor leading to fire exits		1		1		1		1		1	
Non-combustible Material; N. P Not Permitted; N. L No Limit											

Table 3.3.1 (b): Fire Rating for Construction Group II: Combustible

Exterior wall with Fire Separation Distance of	Construction Element Exterior Wall	TYPE -II-A		TYPE -II-B		TYPE -II-C		TYPE -II-D		TYPE -II-E	
		Ratings in Hours	Exterior Opening ^{a,b}	Ratings in Hours	Exterior Opening ^{a,b}	Ratings in Hours	Exterior Opening ^{a,b}	Ratings in Hours	Exterior Opening ^{a,b}	Ratings in Hours	Exterior Opening ^{a,b}
0.9m or less	Bearing	2	N.P	2	N.P	2	N.P	2	N.P	2	N.P
	Non-bearing ^f	2		2		2		2		2	
More than 0.9m but less than 4.5m	Bearing	2	as per provisions of this Code	2	as per provisions of this Code	2	as per provisions of this Code	1	as per provisions of this Code	1	as per provisions of this Code
	Non-bearing ^f	2		2		2		1		1	
4.5m or more but less than 9.0m	Bearing	2		2		2		1		0	
	Non-bearing ^f	2		2		2		1		0	
9.0m or more	Bearing	1	N.L	1½	N.L	1½	N.L	1	N.L	0	N.L
	Non-bearing ^f	0		0		0		0		0	
Interior bearing walls and bearing partitions		2		1		0		1		0	
Enclosure of vertical exits ^e , exit passageways, hoistways and shafts		2		2		1 ⁱ		1 ⁱ		1	
Fire divisions and fire barrier Walls or partitions or ceiling slab		See Table 3.2.1 and provisions of this Code									
Columns ^k , girders, trusses (other than roof trusses) and framing	Supporting one floor	as per provisions of this Code		1		0 or 1 ^j		1		0	
	Supporting more than one floor	as per provisions of this Code		1		0 or 1 ^j		1		0	

Exterior wall with Fire Separation Distance of	Construction Element Exterior Wall	TYPE -II-A		TYPE -II-B		TYPE -II-C		TYPE -II-D		TYPE -II-E	
		Ratings in Hours	Exterior Opening ^{a,b}	Ratings in Hours	Exterior Opening ^{a,b}	Ratings in Hours	Exterior Opening ^{a,b}	Ratings in Hours	Exterior Opening ^{a,b}	Ratings in Hours	Exterior Opening ^{a,b}
Structural members supporting walls		3		2½		2		1½		1	
Floor construction including beams		as per provisions of this Code		1		0 or 1 ⁱ		1		0	
Roof construction, including beams, trusses and framing including arches, domes, shells, cable supported roofs and roof decks ^h	4.5m or less in height above floor to lowest member of ceiling	as per provisions of this Code		¾		0		¾		0	
	4.5m to 6m in height above floor to lowest member of ceiling	as per provisions of this Code		¾		0		¾		0	
	6m or more in height above floor to lowest member of ceiling	as per provisions of this Code		¾		0		¾		0	
Shafts (other than exits) and elevator hoistways		2		2		2		2		2	
Fire separation wall and party wall		4		2		2		2		2	
Access corridor leading to fire exits		1		1		1		1		1	

Non-combustible Material ;

N, P

Not Permitted ;

N, L

No Limit

Notes:

- ^a Requirements of protected exterior openings shall not apply to religious assembly. [Protected openings within an exterior separation of 0.9m or less are permitted for buildings classified in Occupancy Groups A provided, however said openings do not exceed in total area of 25% of the façade of the storey in which they are located. The openings however, may not be credited towards meeting any of the mandatory natural light and ventilation as per provisions of this Code. Protection of openings with an exterior separation of 0.9 m to 9 m shall not be required for A-1, A-2 and A-3 Occupancy groups] or to buildings classified in Occupancy groups J, G and H additional requirements for exterior walls and exterior wall openings as per provisions of this Code.
- ^b Upon special application, the area development authorities may permit exterior wall openings to be constructed in excess of the permitted area established by this Table if such openings at the time of their construction are located at least 18m in a direct line from any neighboring building except as otherwise permitted in footnote f. Such additional openings may not however be credited toward meeting any of the mandatory natural light and ventilation requirements of Sec 1.19 Part 3 of this Code. If any neighboring building is later altered or constructed to come within the above distance limitation, the affected exterior openings shall immediately be closed with construction meeting the fire-resistance rating requirements for exterior wall construction of the building in which they are located.
- ^c Applies to occupancy groups J, G and H
- ^d Applies to occupancy groups J, G and H
- ^e See Provisions of this Code for additional impact resistance requirements applicable to certain stair enclosures and for certain exceptions to stair enclosure requirements.
- ^f When two or more buildings are constructed on the Plot and the combined floor area of the buildings does not exceed the limits established by this Code for any of the buildings, not fire-resistance rating shall be required for non-bearing portions of the exterior walls of those buildings facing each other, and there shall be no limitation on the permitted amount of exterior openings.
- ^g Fire retardant treated wood complying with the requirements of this Code may be used.
- ^h Tabulated ratings apply to buildings over one storey in height. In one storey building, roof construction may be of material having zero hour fire-resistance rating.

- ⁱ Materials which are not non-combustible as defined in this Code may be used in nonbearing construction elements as per provisions for this Code.
- ¹ Materials having a structural base of non-combustible materials as defined in this Code, and having a surface not over 3.2 mm thick which when tested in accordance with the provisions of this Code has a flame spread rating not higher than 50 (fifty).
- ² Materials which when tested in accordance with the provisions of this Code have a surface flame spread rating not higher than twenty five without evidence of continued progressive combustion, and which are of such composition that surface which would be exposed by cutting through the material in any way would not have a flame spread ratings higher than twenty-five without evidence of continued progressive combustion.
- ^j Applies to the construction of the street floor and all construction below the level of the street floor in building or spaces classified in occupancy group A-3 except where the space below the street floor does not exceed five feet in height.
- ^k Columns supporting the roof of a one-story building shall have the same fire-resistance rating as required for a column supporting one floor in a building of the same construction class.
- ^l Members supporting loads of not more than two floors or one floor and a roof need not have a fire-resistance rating greater than the floor construction fire-resistance requirement in buildings classified in occupancy groups B, C and A-3, not including unsprinklered spaces of other occupancies, and in fully sprinklered buildings in occupancy groups E and A-5.

3.1.3.3 Construction Type II-C

This Construction type includes buildings and portion thereof in which

- (a) Exterior walls, fire walls, exit ways, and shaft enclosures are of non-combustible materials having the required fire-resistance ratings; and
- (b) The floors, roofs and interior framing are wholly or partly of wood of smaller dimensions than required for type II-A construction, or are of other combustible or non-combustible materials, having no required fire-resistance rating.

3.1.3.4 Construction Type II-D

This Construction type includes buildings and portion thereof in which exterior walls, bearing walls, floors, roofs, and interior framings are generally of wood or other combustible materials having the required fire-resistance ratings.

3.1.3.5 Construction Type II-E

This Construction type includes buildings and portion thereof in which

- (a) The exterior walls are generally of wood or other combustible materials having the required fire-resistance ratings, and
- (b) In which the bearing walls, floors, roofs, and interior framing are of wood or other combustible materials, generally having no fire-resistance ratings.

3.1.4 Separated Occupancy and Construction

When two or more occupancies accommodated in a building, each such occupancy shall be separated according to the provisions specified in Sec 2.3 Chapter 2 Part 3 and Table 3.2.1.

When two or more types of construction used within a building, the entire building shall be subject to the most restrictive construction type and shall comply with FAR restrictions as per provisions of this Code.

However if the Occupancies within the different Types of Construction are completely separated by construction that meets the fire-resistance rating requirements for fire separation listed in Table 3.2.1 of Chapter 1 Part 3 then each Occupancy so separated may, for the purpose of this Code, be considered as separate building section.

3.1.4.1 Restriction for mixed construction

In buildings of mixed construction, no structural element shall be supported by construction having a lower fire-resistance rating than that required for the element being supported.

3.1.5 Fire Zones

The planning and development authority of the city, township, municipality or region where this Code is intended to be implemented shall divide the area under their jurisdiction into distinct fire zones. The basis for this zoning shall be the fire hazard inherent in the buildings and the degree of safety desired for the occupancy accommodated therein. The number of zones in an area shall depend on its size and the strategies undertaken for its development.

3.1.5.1 Fire Zone 1

The following occupancy groups shall comprise this zone:

Occupancy A: Residential	Occupancy F: Mercantile
Occupancy B: Educational	Occupancy H: Livestock Storage Building
Occupancy C: Institutional for Care	Occupancy I: Assembly
Occupancy D: Health Care	Occupancy K: K1 and K2 Parking
Occupancy E: Offices	Occupancy M: Miscellaneous Buildings

3.1.5.2 Fire Zone 2

The following occupancy groups shall comprise this zone:

Occupancy G: Industrial Buildings

Occupancy H: Storage Buildings

Occupancy K: K3 Parking

3.1.5.3 Fire Zone 3

The only occupancy falling in this zone shall be Occupancy J, Hazardous Buildings.

3.1.5.4 Change in Fire Zone Boundaries

The demarcations of fire zones may be changed or new occupancies may be included in any fire zone through the same procedure as for promulgating new rules or ordinances or both.

3.1.5.5 Buildings on overlapping fire zones

Buildings falling on more than one fire zones shall be considered to be situated on the zone in which the major portion of the building falls. If a building is divided equally between more than one fire zones, it shall be considered as falling in the fire zone having more hazardous occupancy buildings.

3.1.5.6 Restrictions on temporary constructions

Permission may be granted by the Authority for temporary constructions only in fire zones 1 and 2 and not in fire zone 3. Such temporary constructions shall adhere to the conditions of the permission and shall be demolished and removed completely after the expiry of the duration of the permission unless it is extended by the Authority or a new permission is obtained.

3.1.6 Permissible Types of Construction for Various Occupancies

3.1.6.1 New buildings

Types of constructions permitted for various buildings on the basis of fire zones are specified in Table 3.2.4.

3.1.6.2 Existing buildings

Existing buildings in any fire zone need not comply with the provision of this Code for type of construction unless they are altered or in the opinion of the Authority they constitute a hazard to the safety to the occupants of the buildings or the adjacent properties.

3.1.7 Exterior Walls

The fire resistance rating of the exterior walls shall conform to the provisions set forth in Table 3.2.2 and Sec 3.2.3.

3.1.8 Basement Floor

Basement floor of a building shall be enclosed with a one hour fire resistive construction. Doors in such constructions shall be made of noncombustible materials.

3.1.9 Restricting Horizontal and Vertical Spread of Fire

Generally walls restrict horizontal movement and slabs restrict vertical movement of fire.

3.1.9.1 Interior or barrier or enclosure wall

Propagation of fire, smoke, gas or fume through the openings or shafts or penetrations of fire resistive floors and walls shall be restricted by sealing with an approved material which shall have a fire resistance rating at least equal to that of the floor-wall assembly. The sealing material shall be capable of preventing passage of flame and hot gases sufficient to ignite cotton waste when tested in accordance with ASTM E119.

3.1.9.2 Exterior walls

Permitted unprotected openings in the exterior wall in two consecutive floors lying within 1.5 m laterally or vertically shall be separated with flame barriers as similar as sunshades or cornices or projected wall at least 750 mm from the external face of the exterior wall. The flame barrier shall have a fire resistance rating of not less than three-fourths hour.

3.1.10 Exceptions to Fire Resistance Requirements

The provisions of this Section are exceptions to the occupation separation requirements of Table 3.2.1.

3.1.10.1 Fixed partitions

- (a) Stores and Offices: In such cases where offices, stores and similar places occupied by one tenant are separated by non-load bearing walls that do not form a corridor serving an occupant load, the partition walls may be constructed of any one of the following:
- (i) Noncombustible materials;
 - (ii) Fire retardant treated wood;
 - (iii) One hour fire resistive construction;
 - (iv) Wood panels or similar light construction up to three fourths the height of the room in which placed; and
 - (v) Wood panels or similar light construction more than three-fourths the height of the room in which placed with not less than upper one fourth of the partition constructed of glass.

- (b) Hotels and Apartments: In such cases where non-load bearing walls act as interior partitions in individual dwelling units in apartment houses and guest rooms or suites in hotels when such dwelling units, guest rooms or suites are separated from each other and from corridors by not less than one-hour fire-resistive construction, the partition walls may be constructed of any one of the following:
- (i) Noncombustible materials of fire retardant treated wood in buildings of any type of construction; or
 - (ii) Combustible framing with noncombustible materials applied to the framing in buildings of Type II construction.
- (c) Folding, Portable or Movable Partitions: Folding, portable or movable partitions need not have a fire resistance rating if the following conditions are satisfied:
- (i) Required exits are not blocked without providing alternative conforming exits;
 - (ii) Tracks, guides or other approved methods are used to restrict their locations; and
 - (iii) Flammability shall be limited to materials having a flame-spread classification as set forth in Table 3.3.2 for rooms or areas.

Table 3.3.2: Flame Spread Classification

Class	Flame Spread Index
I	0-25
II	26-75
III	76-200

- (d) Walls Fronting on Streets or Yards: For walls fronting on a street or yard having a width of at least 12 m, certain elements of the wall may be constructed as follows regardless of their fire-resistive requirements:
- (i) Bulkheads below show windows, show window frames, aprons and show-cases may be of combustible materials provided the height of such construction does not exceed 5 m above grade.
 - (ii) Wood veneer of boards not less than 25 mm in nominal thickness or exterior type panels not less than 10 mm in nominal thickness may be used in walls provided:
 - the veneer does not extend beyond 5 m above grade; and
 - The veneer is placed either directly against noncombustible surface or furred out from such surfaces not to exceed 40 mm with all concealed spaces fire blocked.

- (e) Trim: Wood may be used to construct trim, picture moulds, chair rails, baseboards, handrails and show window backing. If there is no requirement for using fire protected construction, unprotected wood doors and windows may be used.
- (f) Loading Platform: Noncombustible construction of heavy timber may be used for exterior loading platforms with wood floors not less than 50 mm in nominal thickness. Such wood construction shall not be carried through the exterior walls.
- (g) Insulating Boards: Combustible finished boards may be used under finished flooring.

3.1.11 Shaft Enclosures

3.1.11.1 General

Construction requirement for shafts through floors shall conform to the provisions of Tables 3.3.1 (a) and (b).

3.1.11.2 Extent of enclosures

Shaft enclosures shall extend from the lowest floor opening through successive floor openings and shall be enclosed at the top and bottom.

Exceptions:

- (a) Shafts need not be enclosed at the top if it extends through or to the underside of the roof sheathing, deck or slab.
- (b) Noncombustible ducts carrying vapours, dusts or combustion products may penetrate the enclosure at the bottom.
- (c) Shafts need not be enclosed at the bottom when protected by fire dampers conforming to "Test Methods for Fire Dampers and Ceiling Dampers", installed at the lowest floor level within the shaft enclosure.

3.1.11.3 Special provision

In groups other than Occupancies C and D, openings which penetrate only one floor and are not connected with any other floor or basement and which are not concealed within building construction assemblies need not be enclosed.

3.1.11.4 Protection of openings

Openings in shaft enclosures shall be protected with a self-closing or an automatic-closing fire assembly having a fire resistance rating of

- (a) one hour for one hour fire resistive walls
- (b) one and one-half hours for two hour fire resistive walls

3.1.11.5 Rubbish and linen chute termination rooms:

Rubbish and linen chute shall terminate in rooms separate from the remaining of the building having the same fire resistance as required for shafts in Table 3.3.1 (a) and (b) but not less than one hour.

3.1.12 Expansion and Contraction Joints

Expansion and contraction joints provided to accommodate expansion, contraction, wind or seismic movement shall be protected with an approved material having the same degree of fire resistance as that of the wall or floor in which it is installed.

3.1.13 Weather Protection**3.1.13.1 Weather resistive barrier**

All weather exposed surfaces shall have a weather barrier to protect the interior wall from damping. Such weather barriers shall have a fire resistance rating of at least equal to that of the wall or floor on which it is applied. Weather resistive barrier need not be used in the following cases:

- (i) When exterior covering is of approved waterproof panels
- (ii) In back plastered construction
- (iii) When there is no human occupancy
- (iv) Over water repellent panel sheathing
- (v) Under approved paper backed metal or wire fabric lath
- (vi) Behind lath and Portland cement plaster applied to the underside of roof and eave projections

3.1.13.2 Flashing and counter flashing

Exterior openings exposed to the weather shall be flashed to make them weather proof. There shall be copings with all parapets. Corrosion resistant metals shall be used for flashing, counter flashing and coping.

3.1.13.3 Waterproofing weather-exposed areas

Waterproofing shall be applied to exposed surfaces like balconies, external stairways and landings.

3.1.13.4 Damp-proofing foundation walls

Outside of foundation walls enclosing a basement floor below finished grade shall be damp-proofed from outside.

3.1.14 Members Carrying Walls

All members carrying masonry or concrete walls shall be fire protected as specified in Table 3.3.1 (a) and (b).

3.1.15 Parapets

Parapets constructed on exterior wall of a building shall have the same degree of fire resistance required for the wall upon which they are erected and there shall be noncombustible faces on the side adjacent to the roof surface for the uppermost 405 mm including counter flashing and coping materials. The height of the parapet shall be at least 750 mm from the upper surface of the roof.

3.1.16 Projections

Sunshades, cornices, projected balconies and overhanging beyond walls of Type I construction shall be of noncombustible materials. Projections from walls of Type II may be of combustible or noncombustible materials.

3.1.17 Guards and Stoppers**3.1.17.1 Guards**

Guards or Guardrails shall be provided to protect edges of floor, roof, roof openings, stairways, landings and ramps, balconies or terraces and certain wall, which are elevated more than 750 mm above the grade and as per provisions of this Code.

3.1.17.2 Stoppers

Stopper shall be provided in open parking garages located more than 450 mm above the adjacent grade or back to back parking stall. The height of the stopper shall be at least 300 mm and it shall be positioned at outer edges of a car parking stall.

3.1.18 Insulation

The provisions of this Section are applicable to thermal and acoustical insulations located on or within floor-ceiling and roof ceiling assemblies, crawl spaces, walls, partitions and insulation on pipes and tubing.

Materials used for such insulation and covering shall have a flame spread rating not more than 25 and a smoke density not more than 450.

3.1.19 Atrium**3.1.19.1 General**

Atrium may be provided in all groups other than Occupancy J (Hazardous Buildings). Such atrium shall have a minimum opening and are as specified in Table 3.3.3. A vertical opening serving as other than an exit enclosure connecting only two adjacent stories shall be permitted to be open to one of the two stories.

Table 3.3.3: Atrium Opening and Area

Height in Stories	Minimum Clear Opening ¹ (m)	Minimum Area (m ²)
2-4	6	40
5-7	9	90
8 or more	12	160

¹ The specified dimensions are the diameters of inscribed circles whose centers fall on a common axis for the full height of the atrium.

3.1.19.2 Smoke control system

A mechanically operated air-handling system shall be installed to exhaust the smoke either entering or developed within the atrium.

- (a) Exhaust Openings: The location of the exhaust openings shall be in the ceiling or in a smoke trap area immediately adjacent to the ceiling of the atrium above the top of the highest portion of door openings into the atrium.
- (b) Supply Openings: Supply openings designed for a minimum of 50 percent of the exhaust volume shall be located at the lowest level of the atrium. Supply air may be introduced by gravity provided the height of the atrium is not more than 18 m and smoke control is established. For atria having height greater than 18 m, supply air shall be introduced mechanically from the floor of the atrium and directed vertically toward the exhaust outlets. Supplemental air supply may be introduced at upper levels in atrium over six storeys in height or when tenant spaces above the second storey are open to the atrium.
- (c) Automatic Operation: The smoke control system for the atrium shall be activated automatically by the automatic sprinkler system or smoke detectors installed within the atrium or areas open to the atrium.
- (d) Manual Operation: The smoke control system shall also be manually operable for use by the fire department. The smoke control system may be separate from or integrated with other air handling systems. Air handling systems interfering with the smoke control system shall be shut down automatically when the smoke control system is activated.
- (e) Smoke Detector Location: Smoke detectors which will automatically operate the smoke control system of the atrium shall be accessible for maintenance, testing and servicing. Their locations shall be as follows:
 - (i) At the atrium ceiling, spaced in accordance with the manufacturer's instructions.
 - (ii) On the underside of projections into the atrium, in accordance with the manufacturer's instructions.

- (iii) Around the perimeter of the atrium opening on all floors open to the atrium. These detectors shall be spaced no more than 9 m on centre and shall be located within 5 m of the atrium opening.
- (iv) If projected beam type smoke detectors are used, they shall be installed in accordance with manufacturer's instructions.
- (f) Enclosure of Atrium: Atria shall be separated from the adjacent spaces with fire resistive separation of at least one hour.

Fire windows may be provided in fixed glazed openings when the window has a fire resistive rating of at least three-fourths hour and the area of the opening does not exceed 25 percent of the wall common to the atrium and the room into which the opening is provided.

3.1.20 Mezzanine Floors

Construction of a mezzanine floor shall conform to the requirements of the main floor in which it is constructed but the fire resistance rating need not exceed one hour for unenclosed mezzanines.

PART III
Chapter 4
Energy Efficiency and Sustainability

4.1 Scope

The purpose of including this Chapter in the Code is to enhance the design and construction of buildings through the use of building concepts having a positive environmental impact and encourage sustainable construction practices, allowing efficiency and conservation of energy, water and building materials, and to promote resource efficiency.

In addition to the clauses stipulated here, all Codes and standards relevant to a building occupancy as set forth in other Sections of this Code will be applicable during implementation.

Design and drawings will be submitted to indicate the location, nature and scope of the proposed energy efficient/sustainable feature. These shall indicate compliance to the provisions of this Code, and will be supplied by the relevant design professionals, e.g. electrical engineers, mechanical engineers, plumbing engineers, etc., supporting architectural drawings.

4.1.1 Rationale for Sustainable/Green Buildings

Climate change is an established phenomenon affecting the environment globally and it is recognized that buildings and the built environment play a vital role in the process, impacting on the natural environment and the quality of life. Sustainable development concepts and approaches applied to the design, construction and operation of buildings or to any built environment can enhance both the economic and environmental benefits of the community in Bangladesh and around the world. Energy efficiency and sustainability is not an individual issue rather an integrated and inseparable part of the building design and construction process. The benefits of sustainable design principles include resource and energy efficiency, healthy buildings and materials, ecologically and socially sensitive land use and strengthened local economics and the communities, objectives vital for future development of Bangladesh.