GUYANA STANDARD

Code of Practice
for
Buildings-
Part 3: Fire safety use and occupancy
(First revision)

Prepared by
GUYANA NATIONAL BUREAU OF STANDARDS

Approved by
NATIONAL STANDARDS COUNCIL

PUBLISHED BY THE GUYANA NATIONAL BUREAU OF STANDARDS,
FLAT 15, SOPHIA EXHIBITION COMPLEX,
GEORGETOWN, GUYANA.

Foreword

This section of the Guyana National Building Code is comprised basically of a set of minimum requirements regarding the safety of buildings on aspects of fire protection and structural sufficiency. The primary purpose of this section is the promotion of public safety through the application of appropriate buildings standards.

Occupancy and fire safety requirements depend on the type of occupancy of a building and the use to which it is put.

This section contains interpretive material relating to occupancy classification and the more general features of fire protection. It also includes certain specific requirements relating to building size and occupancy and fire safety within floor areas, exit requirements, fire protection systems, requirements during construction and sign. Access for disabled persons is also featured in this section.

Where specific tests are relevant, reference is made to the appropriate B.S, A.S.T.M, etc, Standards. Relevant codes and standards are also specified or referenced for items such as storage of volatile flammable liquid, smoke and heat vents, installation of mechanical systems, etc.

Contents

Members of the National Building Code Committee

Name	Affiliation
Mr. Melvyn Sankies (**Chairperson**)	University of Guyana, Faculty of Technology
Mr. Neville Munroe	Private Consultant
Mr. Hubert Urlin	Mayor and City Council
Ms. Mary Nagasar	Hand in Hand Insurance
Ms. Dianne Persaud	Guyana Trinidad Fire & Life Insurance
Mr. Patrick Ketwaru	Consultant
Mr. Sheldon Williams	University of Guyana, Faculty of Technology
Mr. William Wilson	University of Guyana/ Guyana Association of Professional Engineers
Mr. George Bobb	Guyana Association of Professional Engineers
Mr. Teofilo Menteiro	PAHO/WHO
Mr. Compton Wintz	Mayor and City Council
Ms. Amanda Adams	Hand-in- Hand Insurance
Mr. Audley Schmidt	Guyana Industrial Training Centre
Mr. Joseph M^{c} Donald	Guyana Fire Service
Mr. Hemraj Seecharran	Guyana Forestry Commission
Mr. Linden Mc Gregor	Guyana Lands and Surveys Commission
Mr. Horace Williams	Office of the Prime Minister
Ms. Beverly Johnson	Mayor and City Council
Mr. Carl Benn	Government Technical Institute
Ms. Denise Pellew	Central Housing and Planning Authority
Mr. Aubrey Roberts	Guyana Water Incorporated
Mr. Horace Woolford	Guyana Power & Light
Mr. Rawle Edinboro	Central Housing and Planning Authority
Mr. Isaac Whittaker	Guyana Electrical Inspectorate Division
Mr. Rudolph Cummings	Guyana Electrical Inspectorate
Mr. William Harris	University of Guyana, Faculty of Technology
Professor Rory Westmaas	University of Guyana, Faculty of Technology
Mr. Kurt Gonsalves	Periera- Walsh Partnership
Mr. Dexter Cornette	Guyana Industrial Training Centre
Ms.Germaine Stewart	Central Housing and Planning Authority
Mr. Noel King	Enkay Engineering Services
Mr. Claude Duncan (**Technical Secretary**)	Guyana National Bureau of Standards

Members of the National Building Code Sub-committee-Fire safety, use and occupancy

Name	Affiliation
Mr. Joseph M^{c} Donald	Guyana Fire Service
Professor Rory Westmaas	University of Guyana, Faculty of Technology
Ms. Beverly Johnson	Mayor and City Council
Mr. Compton Wintz	Mayor and City Council
Ms. Mary Nagasar	Hand in Hand Insurance Company
Ms. Dianne Persaud	Guyana Trinidad Fire & Life Insurance
Mr. Claude Duncan (**Technical Secretary**)	Guyana National Bureau of Standards

Code of Practice
for
Buildings-
Part 3: Fire safety use and occupancy

1 Scope

This Code specifies provisions for fire protection and control of buildings and the classification of all buildings and structures based on occupancy, use and type of construction.

2 Definitions

For the purpose of this Code, the following definitions shall apply:

2.1 **alteration:** A change or extension to any matter or thing, or to any occupancy regulated by this Code.

2.2 **appliance:** A device to convert fuel into energy and includes all components, controls, wiring and piping required to be part of the device by the applicable standard referred to in this Code.

2.3 **attic or roof space:** The space between the roof and the ceiling of the top storey or between a dwarf wall and a sloping roof.

2.4 **building:** Any structure used, or intended for supporting or sheltering any use or occupancy.

2.5 **building area:** The greatest horizontal area of a building above grade within the outside surface of exterior walls or within the outside surface of exterior walls and the centre line of fire walls and party walls.

2.6 **building height (in storeys):** The number of storeys contained between the roof and the ground floor of the first or bottom most lowest storey.

2.7 **closure:** A device or assembly for closing an opening through a fire separation, such as a door, a shutter, wired glass or glass block, and includes all components such as hardware, closing devices, frames and anchors.

2.8 **exhaust duct:** A duct through which air is conveyed from a room or space to the outdoors.

2.9 **exit:** A part of a means of egress that leads from the floor area it serves, including any doorway leading directly from a floor area, to a public thoroughfare or to an acceptable open space.

2.10 **exit, access to:** Part of egress within a floor area that provides access to an exit serving the floor area.

2.11 **exit, horizontal:** That type of exit connecting two floor areas at substantially the same level by means of a doorway, vestibule, bridge or balcony, such floor areas being located whether in different buildings or located in the same building and fully separated from each other by a firewall.

2.12 **exit level:** The lowest level in an enclosed exit stairway from which an exterior door provides access to a public thoroughfare or to an acceptable open space with access to a public thoroughfare at approximately the same level either directly or through a vestibule or exit corridor.

2.13 **exit storey:** A storey from which an exterior door provides direct access at approximately the same level to a public thoroughfare or to an acceptable open space with access to a public thoroughfare.

2.14 **fire compartment:** An enclosed space in a building that is separated from all other parts of the building by enclosing construction providing a fire separation having a required fire-resistance rating.

2.15 **fire damper:** A closure which consists of a normally held open damper installed in an air distribution system or in a wall or floor assembly, and designed to close automatically in the event of a fire in order to maintain the integrity of the fire separation.

2.16 **fire door:** A door and its assembly so constructed and assembled in place as to give the protection against the passage of fire as required by this Code.

2.17 **fire protection rating:** The time in hours or fraction thereof that a closure will withstand the passage of flame when exposed to fire under specified conditions of test and performance criteria, or as otherwise prescribed in this Code.

2.18 **fire-resistance:** The property of a material or assembly to withstand fire or give protection from it; as applied to elements of buildings. It is characterized by the ability to confine a fire or to continue to perform a given structural function, or both. Fire-resistance means also the time in hours or fraction thereof that a material rating or the rating of an assembly of materials will withstand the passage of flame and the transmission of heat when exposed to fire under specified conditions of test and performance criteria, or as determined by extension or interpretation of information derived there-from as prescribed in this section.

2.19 **fire separation:** A construction assembly that acts as a barrier against the spread of fire and may not be required to have a fire-resistance rating or a fire-protection rating.

2.20 **fire stop:** A draft-tight barrier within or between construction assemblies that acts to retard the passage of smoke and flame.

2.21 **firewall:** A type of fire separation of non-combustible construction which sub-divides a building or separates adjoining buildings to resist the spread of fire and which has a fire-resistance rating as prescribed in this section of the Code and has structural stability to remain intact under fire conditions for the required fire-rated time.

2.22 **fire zone:** An area specially designated for the purpose of reducing the fire propagation risks in a commercial or industrial district of high density buildings requiring in such zone, in addition to the other provisions of this section of the Code, restriction on the type of construction or occupancy of any building within such zone.

2.23 **flame spread rating:** An index or classification indicating the extent of spread-of-flame on the surface of material or an assembly of materials as determined in a standard fire test as prescribed in this section of the Code.

2.24 **floor area:** The space on any storey of a building between exterior walls and required firewalls, including the space occupied by interior walls and partitions, but not including exits and vertical service spaces that pierce the storey.

2.25 **flue:** An enclosed conduit for conveying smoke and flue gases.

2.26 **guard:** A protective barrier around openings in floors or at the open sides of stairs, landings, balconies, mezzanines, galleries, raised walkways or other locations to prevent accidental falls from one level to another. Such barrier may or may not have openings through it.

2.27 **heat detector:** A device for sensing an abnormally high air temperature or an abnormal rate of heat rise and automatically initiating a signal indicating this condition.

2.28 **heavy timber construction:** That type of combustible construction in which a degree of fire safety is attained by placing limitations on the sizes of wood structural members and on thickness and composition of wood floors and roofs by the avoidance of concealed spaces under floors and roofs.

2.29 **interconnected floor space:** Super-imposed floor areas or parts of floor areas in which floor assemblies that are required to be fire separations are penetrated by openings that are not provided with closures.

2.30 limiting distance: The distance from an exposing building face to a property line, the centre line of a street, lane, public thoroughfare or a boundary line between two buildings on the same property, measured at right angles to the exposing building face.

2.31 means of egress: A continuous path of travel provided by a doorway, hallway, corridor. Exterior passageway, balcony, lobby, stair, ramp or other egress facility or combination thereof, for the escape of persons from any point in a building, floor area, room or contained open space, to a public thoroughfare or other acceptable open space. (Means of egress includes exits and access to exits).

2.32 occupancy: The use or intended use of a building or part thereof for the shelter or support of persons, animals or items of property.

2.33 plenum: A chamber forming part of an air duct system.

2.34 smoke alarm: A combined smoke detector and audible alarm device designed to sound an alarm within the room or suite in which it is located upon the detection of smoke within that room or suite.

2.35 smoke detector: A device for sensing the presence of visible or invisible particles produced by combustion, and automatically initiating a signal indicating this condition.

2.36 sprinkler (as applying to a building or part thereof): That the building or part thereof is equipped with a system of automatic sprinklers for fire protection and general safety.

2.37 storey: That portion of a building which is situated between the top of any floor and the top of the floor next above it on that portion between the top of such floor and the ceiling above it.

2.38 suite: A single room or series of rooms of complementary use, operated under a single tenancy, and includes dwelling units, individual guest rooms in motels, hotels, boarding houses, rooming houses and dormitories as well as individual suites and individual or complementary rooms for business and personal service occupancies.

2.39 unsafe condition: Any condition that could cause undue hazard to life, limb or health of any person authorized or expected to be on or about the premises.

3 Structural precautions requirements

3.1 Fire-resisting type of construction

The design materials and method of construction of buildings shall comply with the approved rating of resistance to the action of fire while under load, without rapid collapse or disintegration.

3.2 Means of egress

The means of egress and construction of exitways shall be such that:

(a) there is adequate means of escape in the case of fire or other emergency from all parts of the building to a place of safety;

(b) stairways, ramps and passageways shall provide safe passage for users of the building; and

(c) stairways, ramps, floors and balconies, or any roof to which people have access, shall have adequate protection to minimise the risk of falling.

3.3 Fire protection and emergency systems

The installation of built-in equipment and warning systems; and the operation of ventilation and lift services in a building shall be such that:

(a) in the event of fire, adequate fire-suppression equipment shall be available to restrict fire growth to the compartment of origin; minimise damage to the building and its contents; and prevent fire spread to adjoining compartments, buildings or allotments; and

(b) adequate smoke control systems shall be installed to minimise the spread of smoke to escape paths, compartments and other buildings; and to assist access by fire fighters.

3.3.1 Special use and occupancy requirements

Buildings of high hazard uses and assembly shall be designed to reduce the risk of ignition and the spread of fire; and to enable persons to leave such structures and their precincts in safety.

3.3.2 Appurtenances, equipment and installations

The design and installation of fire generating and heat producing appurtenances and appliances, mechanical and electrical equipment and systems, with their accessories shall be of such as to prevent the ignition of combustible material forming part of the building in which such installations are housed.

3.3.3 Fire safety during construction and demolition

Adequate precautions shall be provided in building construction and demolition operations to ensure the protection of workmen and the public against fire hazards.

4 Application of this Code

4.1 The provisions of this Code shall apply to the location, design, materials, equipment and use and to construction, alteration, reconstruction, removal and demolition of every building or structure; and any appurtenances connected to such building and structure.

4.2 All new buildings or structures constructed shall be in conformity with this Code.

4.3 All existing buildings and structures to be enlarged, altered or reconstructed, shall be in conformity with the provisions for new buildings.

5 Occupancy classification of buildings

5.1 All new or existing buildings whatever their size, or of whatever type of construction, shall be classified in one of the categories by the Building Control Authority:

(a) Occupancy Group A - Assembly buildings;
(b) Occupancy Group B - Business buildings;
(c) Occupancy Group F - Factory and industrial buildings;
(d) Occupancy Group H - High hazard buildings;
(e) Occupancy Group I - Institutional buildings;
(f) Occupancy Group M - Mercantile buildings;
(g) Occupancy Group R - Residential buildings;
(h) Occupancy Group S - Storage buildings;
(i) Occupancy Group T - Temporary and miscellaneous uses; or
(j) Mixed occupancies or change in use of occupancy;

Construction classification – Fire ratings of buildings

(i) Type 1 – Fire-proof construction;
(ii) Type 2 – Non-combustible construction;
(iii) Type 3 – Exterior masonry wall construction;
(iv) Type 4 – Frame construction; or
(v) Fire zones.

The Category into which the building is placed shall be determined by its use. Throughout this Code, the category according to use shall be known as its Occupancy Group. In certain instances, for clarity, the words ‘Use Group’ shall occur. These terms shall be regarded as synonymous.

5.1.1 Occupancy Group A-1- Assembly buildings

5.1.1.1 Occupancy Group A-1-A - Structures

This Group shall include all theatres and buildings used primarily for theatrical or operatic performances and exhibitions, arranged with a raised stage, proscenium curtain, fixed or portable scenery loft, lights, motion picture booth, mechanical appliances of other theatrical accessories and equipment provided with fixed seats.

5.1.1.2 Occupancy Group A-1-B -Structures

This Group shall include all theatres without a stage and equipped with fixed seats used for motion picture performances.

5.1.1.3 Occupancy Group A-2- Structures

This Group shall include all buildings and places of public assembly, without theatrical stage accessories, designed for use as dance halls, night clubs and for similar purposes, including all rooms, lobbies and other spaces connected thereto with a common means of egress and entrance.

5.1.1.4 Occupancy Group A-3 -Structures

This Group shall include all buildings with or without an auditorium in which persons assemble for amusement, entertainment or recreation and incidental motion pictures, dramatic, theatrical or educational presentations, lectures, or other purposes without theatrical stage other than a raised platform and principally used without permanent seating facilities, including art galleries, exhibition halls, museums, lecture halls, libraries restaurants other than night clubs and recreation centres and buildings designed for other similar assembly purposes including passenger terminals.

5.1.1.5 Occupancy Group A-4 - Structures

This Group shall include all buildings used as churches, schools, colleges and for similar educational and or religious purposes.

5.1.1.6 Occupancy Group A-5 - Structures

This Group shall include grand stands, bleachers, coliseums, stadiums, drive-in theatres, tents and similar structures for outdoor assembly use, and shall comply with the provisions of this Code for special uses and occupancies.

5.1.2 Occupancy Group B- Business buildings

All buildings and structures or parts thereof which are used for the transaction of business or the rendering of professional services, or for other services that involve stocks of goods, wares or merchandise in limited quantities for use incidental to office uses or sample purposes shall be classified in the Business (B) Occupancy Group. This shall include among other offices, banks, civic administration activities, fire houses, police stations, professional services, testing and research laboratories, radio stations, telephone exchanges and similar establishments.

5.1.3 Occupancy Group F - Factories and industrial buildings

5.1.3.1 All buildings and structures or parts thereof in which occupants are engaged in performing work or labour in fabricating, assembling or processing of products or materials shall be classified in the Factories and Industrial (F) Occupancy Group. Including among others, factories, assembling plants, industrial laboratories and all other industrial and manufacturing uses, except those parts involving highly combustible, flammable or explosive products and materials of the High Hazard Group Occupancy Group H.

The following processes and manufacturers shall be included:

(a) Bakeries;
(b) Boiler works;
(c) Breweries;
(d) Canneries, including food products;
(e) Condensed and powdered milk manufacture;
(f) Dry cleaning using other than volatile flammable liquids in cleaning or dyeing operations;
(g) Electrical light plants and power houses;
(h) Electrolytic reducing works;
(i) Glass plants;
(j) Ice plants;
(k) Leather works and tanneries, excluding enamelling or japanning;
(l) Millwork and woodworking;
(m) Sugar refineries;
(n) Tenant factories, excluding ladies' dresses and other high hazard uses;
(o) Textile mills, including canvas, cotton cloth bagging, burlap, carpets and rags;
(p) Upholstery and manufacturing shops; and
(q) Water pumping plants.

5.1.3.2 Special industrial uses

Buildings and structures designed to house low hazard industrial processes, including among others the production and distribution of electrical, gas or steam power and rolling mills and foundries, requiring large areas and unusual heights to accommodate crane ways or special machinery and equipment, shall be exempted from the height and area limitations.

5.1.3.2.1 Construction

Buildings and structures for special industrial uses shall comply with the requirements of **6.1.2** except for height, and when constructed of non-combustible (Type 2-C) construction have balconies and mezzanine floors which do not exceed two-third the area of the main floor in any one tier.

(a) **Exterior walls**

The exterior walls of buildings for low hazard industrial uses shall be constructed of approved non-combustible and weather-resisting materials. They shall have a fire separation of less than 10m from interior lot lines of any other building and shall be protected or constructed to provide a fire-resistance rating of not less than 2 h.

(b) **Fire protection systems**

Special use industrial buildings shall comply with the requirements of **Clause 8** except that the provisions for automatic fire suppression systems in unlimited area buildings shall be waived by the Building Official when such installations would be detrimental or dangerous to the specific use and occupancy.

5.1.4 Occupancy Group H- High hazard buildings

5.1.4.1 Buildings and structures or parts thereof used for the storage, manufacture or processing of high combustible or explosive products or materials, that are likely to burn with extreme rapidity or which produce poisonous fumes or explosions. Such buildings for storage, also manufacturing which contain highly corrosive, toxic or noxious alkalis, acids or other liquids or chemicals producing flames, fumes, poisonous irritants or corrosive gases, and for the storage or processing of any materials producing explosive mixtures or dust, or which result in the division of matter into fine particles subject to spontaneous ignition shall be classified in Occupancy Group H, High Hazard.

5.1.4.2 The following processes materials and manufacturers indicative of and shall be included in the High Hazard Group:

1. Acetylene gas and gases under pressure of 15 or more and in quantities of greater than 70 m^3 including hydrogen, illuminating natural ammonia, chlorine, phosphene, sulphur dioxide, carbon monoxide, methyl oxide and all gases subject to explosion, fume or toxic hazard.

2. Ammunition, explosives and fireworks manufacture.

3. Apparel manufacturing.

4. Artificial flowers and synthetic manufacture.

5. Celluloid and celluloid products.

6. Cereal, feed, flour and grist mills.

7. Cotton batting and cotton waster processes.

8. Dry cleaning establishments using or storing more than 15L of gasoline or other hazardous liquids with a flash point under 40^0C, or more than 105 L of volatile inflammable liquids with a flash point between 40^0C and 60^0C in closed up tester.

9. Fruit ripening processes.

10. Grain elevators.

11. Hydrogeneration processes.

12. Industries employing solids or substances which ignite or produce flammable gases on contact with water.

13. Kerosene, fuel lubricating or any oil storage with a flashpoint under 80^0 C.

14. Match manufacture or storage.

15. Metal enamelling or japanning.

16. Nitro- cellulose film exchanges and laboratories.

17. Paint and varnish manufacture or spraying or dipping.

18. Petroleum manufacture.

19. Processing of paper or cardboard in loose form.

20. Refrigerating systems using high hazard refrigerants.

21. Shoe polish manufacture.

22. Smoke houses (industrial).

23. Straw goods manufacture or broom corn storage.

24. Sugar and starch pulverising mills.

25. Tar, pitch or resin processing.

26. Tanneries with enamelling or japanning.

27. Tyre storage warehouse.

28. Waste paper sorting or shredding, storage or bailing.

5.1.5 Occupancy Group I - Institutional buildings

All buildings and structures, or parts thereof, in which people suffering from physical limitations because of health or age and harboured for medical or other care or treatment; or buildings in which people are detained for penal or correctional purposes, or in which the liberty of the inmates is restricted shall be classified in the Institutional (I) Occupancy Group.

5.1.5.1 Occupancy Group I - 1

This Group shall include all buildings designed for the detention of people under restraint, including, among others, jails, prisons, reformatories, psychiatric units and similar uses.

5.1.5.2 Occupancy Group I - 2

This Group shall include all buildings used for housing people suffering from physical limitations because of health or age, including, among others, day nurseries, hospitals, sanatoriums, clinics, infirmaries, orphanages and homes for the aged and infirm.

5.1.6 Occupancy Group M – Mercantile buildings

All buildings and structures or parts thereof, shall be classified in the Mercantile (M) Occupancy Group which are used for display and sale purposes, including stocks of goods, wares or merchandise incidental to such purposes and accessible to the public. These shall include, among others, shops, salesrooms and markets, department stores, shopping malls or groups of shops.

Any of the above that contain highly combustible goods, such as merchandise made from pyroxylin products shall be limited to small quantities that do not constitute a high hazard. If no limits are imposed they shall comply with the requirements of **5.1.4**.

5.1.7 Occupancy Group R – Residential buildings

All buildings and structures or parts thereof in which families or households live, or in which sleeping accommodations are provided for individuals with or without dining facilities, excluding those that are classified as institutional buildings, shall be classified in the Residential (R) Occupancy Group.

5.1.7.1 Occupancy Group R-1 Structures

This Group shall include all hotel and motel buildings, lodging houses, boarding houses and dormitory buildings arranged for the shelter and sleeping accommodation of more than twenty individuals.

5.1.7.2 Occupancy Group R-2 Structures

This Group shall include all multiple-family dwellings with more than two dwelling units; and shall include all dormitories, boarding and lodging houses arranged for shelter and sleeping accommodation for more than five and not more than twenty individuals.

5.1.7.3 Occupancy Group R-3 Structures

This Group shall include all buildings arranged for the use of one or two family dwelling units but not more than five lodgers or boarders per family.

5.1.7.4 Occupancy Group R-4 Structures

This Group shall include all buildings with one or two-family dwellings not more than three stories in height, and their accessory structures. All structures shall be designed in accordance with the **One and Two-Family Dwelling Code** or in accordance with the **5.1.7.3**.

5.1.8 Occupancy Group S – Storage buildings

All buildings and structures, or parts thereof, which are used primarily for the storage of goods, wares or merchandise, except those that involve highly combustible or explosive products or materials; including among others, warehouses, storehouses and freight depots shall be classified in the Storage (S) Occupancy Group.

5.1.8.1 Occupancy Group S-1 Structures

This Group shall include buildings used for the storage of moderate hazard contents, which to burn with moderate rapidity and do not produce poisonous gases, fumes or explosives; and the following:

1. Bags, cloth burlap and paper;
2. Bamboo and rattan baskets;
3. Belting, canvas and leather;
4. Books and paper in rolls or packs;
5. Buttons, including cloth- covered, pearl or bone;
6. Cardboard and cardboard boxes;
7. Clothing, woollen wearing apparel;
8. Cordage;
9. Fibre board;
10. Furniture;
11. Furs;
12. Glue, mucilage, paste and size;
13. Horn and combs, other than celluloid;
14. Leather enamelling or japanning;
15. Linoleum;
16. Livestock shelters;
17. Lumber yards;
18. Motor vehicle repair shops;
19. Petroleum warehouses for storage of lubricating oils with a flash point of 150^0C or higher;
20. Photo engraving;
21. Public garages (Group 1) and stables;
22. Silk;
23. Soap;
24. Sugar;
25. Tobacco, cigars, cigarettes and snuff;
26. Upholstering and mattress manufacturing; and
27. Wax candles.

5.1.8.2 Occupancy Group S- 2 Structures

This Group shall include buildings used for the storage of non- combustible materials, and low hazard wares (such as asbestos, chalk, food products, metals, glass, motor car spares (excluding upholstery), plumbing wares (metallic or ceramic pipe and fittings), porcelain and pottery; and talc and soap stones, which do not burn rapidly.

5.1.9 Occupancy Group T- Temporary and miscellaneous uses

5.1.9.1 Temporary and miscellaneous structures and buildings, not classified in any use or occupancy group, shall be constructed, equipped and maintained to meet the requirements of fire and life hazard incidental to their use. Miscellaneous uses shall include all accessory buildings and/or structures used as private garages, builders and other sheds, reviewing stands, fences and similar purposes. It shall include temporary shelters as tents and marquees and air-supported structures.

5.1.9.2 Doubtful occupancy classification

When a building or structure is proposed for use not provided for under any of the occupancy groups in this Code; or when an existing building is to be used for some purposes where there is doubt about its new classification, the Building Authority or controlling official shall class it in the occupancy group it nearly resembles in respect to the existing or proposed life and fire hazard.

5.1.10 Mixed occupancies or change in the use of occupancy

5.1.10.1 When a building is occupied for two or more uses, (that is, where two or more occupancy classifications exist in the same building), established by the Building Control Authority; and that the divisions between the two or more differing occupancies, whether they be walls or floors, shall comply with the relevant fire code requirements of 1 ½ - 2h fire rating.

5.1.10.2 Any building with two or more occupancy groups which has to comply with two or more Codes for fire resistance then the one that requires the highest rating shall be used for both or all occupancies (that is, when the Code specifies $1^1/_2$ h fire resistance in party walls or floors, and the second for this occupancy classification with all walls and floors having the longer 2h rating, this rating shall apply for all construction elements).

5.1.10.3 Incidental uses

Where the higher or highest hazard use or occupancy classification is supplementary to the main use or classification of the building (that is, less than 10% of the total floor area of the building, provided that such area of use is constructed and segregated by

the fire resistance rate of construction as required under the relevant fire Code, the building shall still be classified according to its main use and classification).

5.2 Change in occupancy classification

5.2.1 No change shall be made in the occupancy of any existing, under construction or new building without the approval of the Building Control Authority.

5.2.2 Buildings in existence shall have the existing use or occupancy continued only, if such or occupancy is not dangerous to life. The Building Control Authority or its authorised representative shall conduct periodical inspections to ensure that the minimum standards of safety are maintained.

6 Construction classification of buildings

6.1 All buildings and structures erected, or to be erected, altered or extended in height or area shall be classified in any one, or in a combination of the four construction types:

(a) Type 1 - Fireproof construction (Includes Type 1-A and 1-B);

(b) Type 2 - Non- combustible construction (Includes Type 2- A, 2-B and 2-C);

(c) Type 3 - Exterior masonry wall construction (Includes Type 3- A, 3-B and 3-C); and

(d) Type 4 - Frame construction (Includes and Type 4-A and 4-B).

A building shall not be designated as a given type of construction unless it conforms to the minimum requirements for that type. It is unlawful to post or use, or designate or advertise a building as a given type of construction unless it complies with the minimum requirements of this Code.

Note: The sub- clauses shall be used as a guide for fire rating under Construction Classification (Type 1,2,3 or 4) but the sub- clause on Fire- resistive construction requirements shall be used when designing all buildings of whatever occupancy.

6.1.1 Type 1- Fire-proof construction

Buildings and structures of fireproof construction shall have walls, partitions, structural elements, floors, ceilings, roofs and exitways constructed and protected with approved non-combustible materials to afford the fire- resistance rating specified in **Table 1** except as otherwise specifically regulated by the provisions of **7.7**. Fireproof buildings shall be classified as Types 1-A or 1-B. Fire- retardant-treated wood may be used.

Table 1

Occupancy classification	Maximum size of impartment at or below nominated height (m^2) Type of fire- resisting construction		
	Type 1 Fireproof construction		**Type 2 Frame construction**
	Y Sprinklered	N	
A - Assembly			
A- 1 Theatre	3	2	500
Height (storeys)			
Area (m^2)	No Limit	1000	
A -2 Night club			
Height (storeys)	No Limit	3	1
Area (m^2)	3000	500	500
M- Mercantile			
Height (storeys)	No Limit	6	2
Area (m^2)	8000	3500	1000
or			
Height (storeys)			1 (See Note)
Area (m^2)			2000
R Residential			
R-1 Hotel, Motel			
Height (storeys)	No Limit	6	1 (See Note)
Area (m^2)	No Limit	2000	2000
R- 2 Apartments			
Height (storeys)	No Limit	6	1 (See Note)
Area (m^2)	No Limit	2000	2000
R- 3 Houses			
Height (storeys)	N/A	N/A	No Limit
Area (m^2)	N/A	N/A	2000
S - Storage			
Height (storeys)	No Limit	6	2
Area (m^2)	8000	4000	1000
or			
Height (storeys)			1 (See Note)
Area (m^2)			3000

6.1.2 Type 2- Non- combustible construction

Buildings and structures of non- combustible construction shall have walls, partitions, structural elements, floors, ceilings, roofs and exitways constructed of approved non-combustible materials conforming to the fire-resistance rating requirements except as modified by the fire limit restrictions of non-combustible buildings. It shall be classified as Types 2-A, 2-B or 2-C. Fire-retardant treated wood may be used.

6.1.3 Type 3- Exterior masonry wall construction

Buildings and structures of exterior masonry wall construction shall have exterior and fire and party walls constructed of masonry or other approved non- combustible materials, of the required fire-resistance rating and structural properties. The floors, roofs and interior framing shall be wholly or partly of wood or of metal or other approved construction. The fire and party walls shall be ground supported, except for girders and their supports which walls of masonry. These shall be protected to exert the same degree of fire-resistance rating of the walls supported thereon; and all structural elements shall have the required fire- resistance rating.

6.1.3.1 Type 3- A

Buildings and structures of heavy timber construction shall attain the required fire-resistance rating by placing limitations on the minimum sizes of wood structural members; and on minimum thickness and composition of wood floorings and roofing, by the avoidance or proper protection by fire-stopping or other acceptable means of concealed spaced under floors and roofs. This shall be done by the use of approved fastenings, construction details and adhesives for structural members; and by providing the required degree of fire- resistance rating in exterior and interior walls.

(a) **Columns**

Wood columns shall be sawn or glue-laminated. It shall be 200 mm, nominal in any dimension. When supporting floor loads, it shall be 150 mm nominal in width; and 200 mm nominal in depth when supporting roof and ceiling loads only.

(b) **Floor framing**

Beams and girders of wood shall be sawn or glue- laminated. It shall be 150 mm nominal, in width and 250 mm nominal in depth. Framed or glue- laminated arches which spring from the floor line and support floor loads shall be 200 mm nominal in any dimension. Framed timber trusses supporting floor loads shall have members of 200 mm nominal in any dimension.

(c) **Roof framing**

Framed or glue- laminated arches for roof construction which spring from the floor line or from ground level and do not support floor loads shall have members of 150 mm nominal in width; and 200 mm nominal in depth for the lower half of the height and 150 mm nominal in depth for the upper half. Framed or glue- laminated arches for roof construction which spring from the top support floor loads shall have members of 100 mm nominal in width and 150 mm nominal in depth.

Spaced members shall be composed of two (2) or more pieces of 75 mm nominal in thickness when blocked solidly throughout their intervening spaces or when such spaces are tightly closed by continuous wood cover pieces of 50 mm nominal in thickness, secured to the underside of the members. Splice plates shall be 75 mm nominal in thickness. When protected by approved automatic sprinklers under the roof deck, framing members shall be 75 mm nominal in width.

(d) **Flooring**

Floors shall be without concealed spaces. It shall be of sawn or glue-laminated plank splined or tongued and grooved. Floors shall be 75 mm nominal in thickness covered with 25 mm nominal dimension tongued-and-grooved flooring laid crosswise or diagonally; or 12 mm plywood or particle board; or of planks 100 mm nominal set on the edge close together and laid as required for floors. Other types of decking may be used, if providing equivalent fire rating structural properties.

(e) **Bearing walls**

Bearing portions of exterior and interior walls shall be of approved non- combustible material and shall have a fire – resistance of 2h.

(f) **Non- bearing walls**

Non-bearing portions of exterior walls shall be of approved non- combustible materials, except as otherwise noted and where a horizontal separation of 6 m is provided. Non-bearing exterior walls shall have a fire-resistance rating of 2h. Where a horizontal separation of 6-9m is provided, non-bearing exterior walls shall have a fire- resistance rating of 1 h.

Where a horizontal separation of 9 m or more is provided, fire-resistance rating is not required. Where a horizontal separation of 6 m or more is provided, wood columns and arches conforming to heavy timber sizes shall be used externally.

6.1.3.2 Type 3-B

Structures of Type 3-B (ordinary protected) shall include all exterior masonry wall buildings in which the interior structural elements are wholly or partly of fire- protected wood of 50 mm nominal thickness, or of other approved protected combustible materials; or of metal protected and insulated materials; to afford the specified fire- resistance rating.

6.2 Fire construction

Fire zones

The Central Housing and Planning Authority (CH&PA), the Guyana Fire Service and/or the relevant local authority shall, for the purpose of this Code, establish, in any town or city, Fire Zones, based on the fire hazard inherent in buildings or structures in commercial or industrial areas, or high density buildings according to occupancy; and requiring in addition to the other provisions of this Code, restrictions on the types of construction or occupancy of the buildings within such zones.

7 Structural precautions (Fire-resisting types of construction)

7.1 Buildings which fall within the categories specified in this Code shall be divided into compartments by means of compartment walls and floors, or both.

7.2 The maximum floor area of a fire compartment and the maximum height (measured in storeys) at which the compartment occur within the building, shall be within the limitations specified in **Table 1**.

7.3 The height of a building in storeys shall be the number of occupied or un-occupied floor levels counted from ground level to the top of the building at any point except the following:

(a) in non- residential occupancies, a mezzanine shall not be counted as a storey if it does not cover more than $^{2}/_{3}$ of the lower floor area;

(b) in Group R- Residential Occupancies, an intermediate floor space wholly within the separating enclosure of a dwelling unit shall not be counted as a storey; and

(c) a storey containing only plant rooms or service equipment, such as air-conditioning plants, heaters, water tanks or pumps, electrical, or telephone switchboard, shall not be counted as a storey, provided it is separated from other parts of the building by construction with a fire rating of at least 2 h.

7.4 The floor area shall be measured between the exterior walls and the required walls of the building, including the space occupied by interior walls and partitions, but excluding the space taken up by stair and service shafts.

The area of fire compartment is the sum of all floor areas that are contained:

(a) In Type 2 - Frame construction, in the entire building; or

(b) In Type 1- Fireproof Construction, in each storey of the building, including any mezzanines therein.

Notes: 1. The floor area of factories and warehouses, and open- deck car parks may be unlimited in area.

2. Further sub- division within fire compartments is required in hospitals, hotels and apartment buildings and prisons.

3. Stadiums shall comply with the requirements specified.

4. Schools may have an area of 3000m^2 if all classrooms open directly to the outside.

5. Spandrels providing vertical separation between fire compartments and fire-rated construction, separating fire compartments shall comply with the requirements specified.

6. Openings in constructions, separating fire compartments shall be protected as prescribed.

7.5 Fire resistance

7.5.1 Type 1-Fireproof construction

7.5.1.1 Where required buildings may be constructed in Type 1- Fireproof Construction. The windows, doorways and other openings in exterior walls within 3m separation shall be protected with 1 h fire- rated assemblies.

7.5.1.2 Each part of the building shall have the fire rating specified for the occupancy classification concerned (**See Table 2).**

7.5.1.3 Party-walls and common walls, separating buildings, exterior walls, fire walls, interior load bearing walls, stairs, ramps and lift shafts, columns and floors shall not be combustible.

7.5.1.4 In a building more than 2 storeys in height, the roof shall:

(a) be of reinforced concrete construction with a fire-rating of 1 h;

(b) be constructed with a metal or fire- resistant or impregnated timber frame and lined with a non- combustible material;

(c) have a ceiling lined with 1h fire rated material; and

(d) roof lights constructed in the roof shall have an area of light spread not more than 20 % of the roof surface, and shall not be closer than 3m to another building or to any unprotected part of the building that projects above the roof light.

7.5.1.5 The following steps shall be taken to prevent and limit the spread of fires in a small building:

(a) interior partitions constructed of timber or concrete blocks shall be carried to the underside of the roof;

(b) ceilings shall not be made of flammable material;

(c) drapes, curtains, cushion covering etc. made of synthetic materials shall not be in kitchen areas;

(d) kitchens shall have an exterior door which opens outwards;

(e) all exterior doors of the house shall open outwards, but interior doors shall open inwards;

(f) all windows shall be opened from inside the house. Hurricane shutters shall be removed as soon as possible after an emergency is over;

(g) stairways shall be 1m wide for persons to be carried down the stairs to safety;

(h) kitchen floors shall be of concrete and if of timber, shall be covered with a fire- resistant material. Stoves shall not be placed near material which is not fire – resistant. If this is necessary, protecting the timber with zinc or aluminium sheeting is recommended, as this would inhibit the start of fires;

(i) inspection of all electrical installations shall be rigorously pursed in accordance with the Electricity Regulations;

(j) steel frames shall be encased in concrete, 38mm thick, as steel structures fail suddenly under extreme heat; and

(k) distances from boundary.

Notes:
1. **Concessions for floors are allowed in accordingly.**
2. **Concessions for Group S- Storage buildings used as open- deck public garages are also allowed.**
3. **Type 1 Construction is not applicable to Occupancy Classification R-3- Dwellings.**
4. **Concessions for stadiums are allowed in.**
5. **Concessions for motor fuel service stations are allowed in.**

Table 2

Type 1- Fire proof construction

	Fire - resistance rating in h Occupancy Classification			
Building Element	A- 4	A- 3	A-1	H
	I- 2	A- 5	A-2	
	R- 1	B	M	
	R- 2	F	S	
External walls and columns Load bearing or non- load bearing	1 1/2	2	3	4
Fire walls and party walls	1 ½	2	3	4
Stairway shafts, lift and other shafts	1	2	3	4
Floors (Including basement floors)	1 ½	2	3	4
Internal walls and columns Load bearing	1 1/2	2	3	4
Non- load bearing:				
(a) separating tenancies	Na	1	1	1
(b) bounding dwelling units	1	1	Na	Na

7.5.2 Type 2- Frame construction

7.5.2.1 Buildings may be constructed in Type 2- Frame Construction **(See 3.1)**. The windows, doorways and other openings in an exterior wall that is required to be fire rated shall be protected with 1 h fire rated assemblies (**See Table 3**).

Each part listed in **Table 1** shall have the fire rating specified in **Table 1** for the Occupancy Classification concerned.

Notes: 1 Concessions for Group S -Storage buildings used as open-deck public garages are allowed.

2. Concessions for stadiums and spectator stands are allowed.

3. Concessions for motor fuel service stations are allowed in.

4. Concessions for floors are allowed.

3m if the windows or openings are protected with 1 h closures, or the building is sprinklered; or 6m otherwise.

Table 3

Type 4- Frame construction

	Fire- resistance rating in h Occupancy Classification			
Building Element	A- 4 R I- 1 I- 2	A- 3 A- 5 B F	A- 1 A-2 M S	H
External walls and columns Load bearing or non- load bearing				
Separation less than 1m	$1\,^1/_2$	2	3	4
(a) 1m to less than 3m	-	2	2	4
(b) 3m to less than 10m	-	-	-	2
(c) 10m or over	-	-	-	-
Fire walls and party walls	$1\,^1/_2$	2	3	4
Stairway shafts, lift and other shafts	1	2	3	4
Floors (Including basement floors)	$1\,^1/_2$	2	3	4
Internal walls				
(a) separating tenancies	Na	1	1	1
(b) bounding dwelling units	1	1	Na	Na

7.6 Stairways, ramps and lift, and ventilation shafts

7.6.1 In a fire- isolated stairway or ramp:

(a) the ramp or flights and landings of the stair, shall be constructed of non-combustible materials, so that if there is local failure, it will not cause structural damage or impair the fire – resistance of the shaft;

(b) the part of the stairway or ramp serving any basement storeys shall be separated from upper storeys with 1 h fire rated construction and if 1 h fire doors, to prevent the spread of fire and smoke;

(c) the space below a fire-rated stairway or ramp shall not be enclosed to form a cupboard or storage area; and

(d) windows or other openings shall be located on the outside wall provided they are not exposed to any part of the external wall of the building with a fire rating less than 2 h.

7.6.2 In a non-fire isolated stairway or ramp, the space below shall not be enclosed unless:

(a) the underside of the stair or ramp and enclosing walls and ceiling are lined with a material having a fire rating of 1 h; and

(b) a self- closing 1 h fire door is fitted to the access doorway.

7.6.3 Termination of shaft walls

The walls of a stair, ramp, lift, ventilation or other shaft which do not extend to the roof shall terminate at the underside of concrete slab which has a fire rating of at least 2h.

7.6.4 Plant rooms

Except as otherwise provided, a room or space containing the following equipment shall have bounding walls with 2 h fire- rating:

(a) lift motors and lift control panels;
(b) stair pressurising equipment;
(c) electricity substation, emergency generators or batteries;
(d) the main electrical switchboard in a building if it supports emergency equipment including lifts, smoke control ventilation systems, alarm systems, automatic door or window closing devices, hydrant or sprinkler pumps, emergency lighting or exit signs, and the like;

(e) central smoke control ventilation plant;
(f) boilers; and
(g) sprinkler valve equipment.

Doorways and other openings in the enclosing structure of plant rooms shall be protected with 1 h self- closing fire doors, except where an opening to the outside is separated from any other building by 3m.

7.6.5 Exceptions from enclosure

The following equipment shall not be separated with a fire rated enclosure:

(a) ventilation or other equipment located in a separate storey or at the topmost storey which is separated from the remainder of the building floor and wall construction with 2 h fire rating; and

(b) smoke control exhaust fans located in the air stream if they are designed for high temperature operation.

7.6.6 Embedment and enclosures

(a) **Pipes, conduits and other services**

Pipes, conduits, and other services shall not be embedded in the fire- protective covering of a structural member that is individually encased.

(b) **Impact protection**

Where the fire protective covering of a structural member is subject to impact damage from moving vehicles, the handling of merchandise or other activity:

(a) the fire- protective covering shall be with corner guards or a substantial jacket of metal or other non- combustible material; and

(b) such guard or jacket shall extend to a height adequate to provide protection from 1.5 m from floor level.

(c) **Protection against corrosion**

Adequate cover shall be provided to reinforcement and other metal parts of external reinforced concrete and steel structural members for protection against corrosion, particularly where exposed to salt- air sea atmosphere.

7.7 Penetration

7.7.1 Cutting and chasing

A block masonry, concrete wall or concrete floor slab shall not be cut for chases or socketed for insertion of services or attachment of structural members subsequent to erection unless the thickness of wall remaining is not less than 100mm and sufficient cover or fire- stopping material is applied to the reinstate the required fire rating if any.

7.7.2 Combustible framing into wall sections

Where combustible members frame into walls:

(a) any hollow spaces shall be filled with fire- stopping material for the full thickness of the wall and a distance not less than 100mm above and below the combustible member; and

(b) the thickness of wall remaining shall be not less than 100mm.

7.7.3 Penetration through fire- rated members

Pipe and cable risers shall be located in fire- rated shafts or ducts except where a single pipe or cable penetrates a wall, floor or other assembly that is required to be fire rated in which case:

(a) a PVC pipe for sanitary drainage connecting more than 2 fire compartments shall have suitable fire- stop collars or metal sleeves at each penetration;

(b) a metal pipe or cable shall be adequately fire- stopped; and

(c) the aggregate area of such penetration shall not be more than 700cm^2 in any 10m^2 of wall or floor area.

7.7.4 Fire dampers in air ducts

Except where proper fire tests have shown that fire dampers are not necessary to maintain the integrity of the fire-rated assembly, fire dampers complying with the relevant standards shall be installed in the following location:

(a) ducts penetrating a fire wall between different fire compartments within the same building, and ducts penetrating a party wall or common wall between buildings;

(b) ducts penetrating a fire- rated shaft wall. Sub- ducts may be used in smoke exhaust systems instead of dampers;

(c) ducts penetrating the ceiling of a fire rated floor/ ceiling or room/ceiling assembly; and

(d) ducts penetrating a fire- rated floor between storeys of building.

7.7.5 Fixtures in fire- rated ceiling assemblies

In a ceiling which is part of a floor/ ceiling or roof/ceiling fire rated assembly:

(a) the ceiling may have penetrations to accommodate non- combustible piping, ducts or electric outlets, provided the aggregate area of such openings is not more than 700cm^2 in any 10 m^2 of ceiling area;

(b) any fixtures or attachments shall be installed so as not to decrease the fire rating of the assembly; and

(c) where lay-in ceiling panels are used in the assembly and the weight of the panels is not adequate to resist an upward force of 5 kg/m^2, metal ties shall be installed to prevent vertical displacement under such upward force.

7.7.6 Opening protection

7.7.6.1 Protection generally

Every door, window or other opening in a wall required to have a fire- rating shall be protected with a labelled automatic or self- closing assembly.

7.7.6.2 Fire door, fire windows and fire shutters

(a) Fire door, fire window and fire shutter assemblies, including hardware and all other attachments, shall comply with the latest edition of the relevant ASTM, BSI, or corresponding standards of manufacture to achieve the required fire- rating, and shall be labelled accordingly.

(b) A glass panel shall be incorporated in a fire door except when located in a party wall, provided:

(i) the glass is of a type which will achieve the fire rating of the door; or

(ii) in the case of wired or plain glass, the panel shall not exceed 600 cm^2 area.

(c) Fire windows shall be certified by the manufacturer as achieving the required fire rating, or in the case of a 1h fire window shall consist of:

(i) a steel, aluminium or bronze window assembly with sash and frame of material not less than 3.2 mm thickness; and

(ii) wired glass not less than 6mm thickness in a panel not more than 8,000 cm^2 in area .

7.7.7 Self – closing and automatic holding devices

In the case of a sliding fire door in a fire wall, party wall or common wall which is open when the building is in use:

(a) The door shall have fusible link incorporated in the closing device, or be kept open with an electromagnetic device, which when de- activated, allows the door to be fully closed within 20 to 30 seconds after release;

(b) Where a fusible link is not used, the automatic closing operation shall be activated by heat actuated detectors located on each side of the opening at ceiling height not more than 1m above the head of the opening;

(c) An audible warning device located near the doorway and a red flashing warning light on each side of the doorway shall be activated when the door starts to close, and signs shall be installed on each side of the doorway directly over the opening stating: **WARNING – SLIDING DOOR**, in capital letters not less than 50 mm high and in a colour contrasting with the background;

(d) In horizontal exits, or doors in fire walls, party walls or common walls which are normally closed when the building is in use, and which form part of two- way exits, doors shall be self- closing and if fitted with automatic hold-open devices, closure shall be initiated by smoke detectors located on each side within 1.5m of the doorway;

(e) In fire- isolated exit-ways, doors shall be self-closing and if fitted with automatic hold-open devices, closure side shall be initiated by smoke detectors located not more than 1.5m on the approach of the doorway; and

(f) Closure shall be activated by any required central fire alarm system or sprinkler system within the building.

7.7.8 Interior finish and linings

7.7.8.1 General requirements

Interior finishes and linings, and the exposed surface of structural and non- structural interior parts of buildings:

(a) including partitions, wall linings and coverings, panelling columns and ceilings; or;

(b) trim and other minor finishes listed or exempted, shall not exceed the ratings for flame spread, determined under the latest edition of ASTM E 84, AS 15303, CAN54- S102, or equivalent, specified for exitways and other spaces in relation to the particular occupancy classification (**See Table 4**).

Table 4

Restrictions on interior finish

Occupancy classification of room or space	**Maximum rating**		
	Smoke developed	**Flame spread**	
	All Spaces	**Exitways and basement**	**Other spaces**
A - Assembly Occupancy load not more than 50 persons	450 450	25 25	75 200
B- Business	450	75	200
F- Factory	450	75	200
H- Hazardous	450	25	75
I- Institutional	450	25	75
M- Mercantile	450	75	200
R- Residential	450	75	200
S- Storage	450	75	200
T- Temporary	450	75	200

7.7.8.2 Minor finishes and trim

The following linings, trim and other minor finishes need not comply with **Table 2** provided they do not exceed 5% of the surface area of the walls and ceilings in the room or space concerned:

(a) timber skirting, architraves, picture or chair rails, cornices;

(b) window or door frames (not fire- rated);

(c) solid timber hand rails; and

(d) roof lights or windows of glass fibre reinforced polyester (GRP), not closer than 1.5m to another roof light or window and not exceeding 10% of the ceiling or wall area.

7.7.9 Exemptions

The following attachments or fixtures are exempted from the requirements of **Table 2:**

(a) electrical switches, outlets or cover plates;

(b) materials used for caulking, flashing or sealing;

(c) paint or varnish, other than nitro- cellulose lacquer;

(d) face plates of air- handling systems; and

(e) face plates or diffuser plates of light fittings and exit signs, and associated wiring and components.

7.7.10 Attachment of interior finishes

Interior finish materials which are attached to walls, ceiling or structural elements of a building that are required to be fire- rated or non- combustible shall:

(a) be applied directly against the exposed surface of such wall, ceiling or element;

(b) be fixed to furring strips attached to the exposed surface with all concealed spaced fire- stopped if they are more than $1m^2$ in surface area or 2.5m in any dimension;

(c) have a flame spread rating of not more than 25 and a smoke developed rating not more than 450 on both sides except if the concealed space is sprinklered; and

(d) be applied or otherwise fastened in such a manner that they will not readily become detached when subjected to room temperature of 95^0 C or more for 30 minutes, or otherwise become loose through changes in the setting medium from the effects of time or conditions of occupancy.

7.7.11 Attachments and decorative materials

7.7.11.1 Drapes and hangings

In Occupancy Group A, all drapes, hangings and other decorative material or furnishings suspended from walls or ceilings shall:

(a) be non- combustible or flame- resistant;

(b) the area of non- combustible decorative materials shall not be limited; and

(c) the area of flame-resistant materials shall not exceed 10% of the total wall and ceiling area.

7.7.11.2 External attachments

All structures attached to the exterior or on the roof of buildings required to be of Type 1- Fireproof Construction shall be non-combustible, except:

(a) antenna, aerial or clothesline supports, electronic equipment, masts, or flagpoles, not more than 3m in height from the point of attachment;

(b) water tanks, tank stands or air- conditioning cooling towers;

(c) window and door frames and sashes which are not required to be fire rated; and

(d) advertising and other signs.

Provided they do not prove a means of fire spread to other parts of the building or adjoining properties.

7.7.12 Fire doors

7.7.12.1 The provisions of this sub-clause shall apply to any door which is required to have fire resistance.

7.7.12.2 Requirements for fire resistance

(a) Where two separate doors (each being either a simple leaf or a double leaf door) are installed in an opening, it shall be sufficient, if the required period of fire resistance is achieved by the two doors together or each of them separately.

(b) A fire door, if exposed to an approved test for its period of fire resistance, shall, when fitted in its frame, satisfy the requirements of the test as to freedom from collapse and as to resistance to the passage of flame for 30 minutes.

7.7.12.3 Location of fire doors

Fire doors shall be placed:

(a) in an exit of the buildings within the listed categories;

(b) in a compartment wall;

(c) between a protected shaft and a hall, lobby or corridor which forms part of an exit; and

(d) in a wall separating a flat or maisonette from the space in common use giving access to that flat or maisonette.

7.7.12.4 Self-closing device

Every fire floor shall be fitted with a suitable automatic self-closing device.

7.7.13 Fire stopping

Any fire stop required by the provisions of this standard shall be so formed and positioned as to prevent and sufficiently retard the passage of flame.

7.7.14 Roofs

(a) Every roof shall be so covered or so isolated from other buildings as to afford adequate protection against the spread of fire into the building and to adjoining buildings.

(b) Where the ceilings and the underside of roofs of industrial buildings are covered with an insulating material, the exposed surface of the material shall be resistant to the spread of flame.

8 Special use and occupancy requirements (High hazard occupancies)

8.1 Application

In addition to the requirements of this Code, the provisions of this subsection shall control all buildings for high hazard uses and places of assembly which are susceptible to panic incidental to crowds.

8.2 Explosion hazards

8.2.2 Venting devices

A structure, room or space occupied for uses involving an explosion hazard shall be equipped and vented with explosion relief systems and devices to relieve pressure resulting from explosive air-vapour mixtures, consisting of windows, skylights, vents, flues or releasing wall or roof panels with:

(a) aggregate clear area of $1m^2$ for each $20m^2$ of building volume, and not less than 10% of the area of enclosing walls; and

(b) not less than 50% of vents arranged for automatic release under predetermined increase in pressure in accordance with accepted engineering standards and practice.

8.2.2 Construction of venting devices

Relief devices shall:

(a) be constructed of lightweight, non-combustible and corrosion-resistant materials; and;

(b) have the discharge end protected with screens of 19mm mesh, arranged to blow out under relatively low pressures.

8.2.3 Discharge of relief vents

Relief vents shall discharge directly to the open air in an unoccupied public place or a space on the same allotment 6 m in width, at a point:

(a) which is not 3 m vertically and 6 m horizontally from any window opening or exitway from the same or any adjoining building; and

(b) such that the exhaust shall always be in the direction of least exposure and never into the exterior of any building.

8.3 Volatile flammable

8.3.1 Storage and handling

Unless otherwise approved by the Guyana Fire Service Department:

(a) storage in process rooms of volatile flammable materials such as paint, varnish, solvents or petroleum products, shall be limited to one day's supply in sealed containers of 25 litre capacity or in steel barrels or drums of 250 litre capacity;

(b) discharge, decanting, or filling operations shall be by pump through an approved system of securely attached and continuous piping or hose lines; and

(c) in processes requiring the use of open vats or mixing tanks, an approved mechanical ventilating system shall be provided to remove the vapors of, to produce a diluted vapour mixture of not more than 1% concentration.

8.3.2 Construction of enclosures

Process rooms shall:

(a) be separated from other uses and occupancies by walls, floors and ceilings of 2 h fire – resistance rating, and have access doorways provided with 1 ½ h fire doors and non- combustible sills at doorways 150mm high;

(b) have floors that are waterproof and drained;

(c) have at least two different paths of egress from a point within the enclosure leading to the outside of the building in accordance with sub- clause 7.5; and

(d) have "**NO SMOKING**" signs advising that smoking is prohibited in or near the enclosure.

8.3.3 Fire protection

Where volatile flammable liquids are stored or processed:

(a) first aid fire appliances and/ or automatic fire- extinguishing systems shall be provided in accordance with **Clause 8**;

(b) only electric incandescent lighting shall be used in, and within 6m of such enclosures and all light fittings shall be of suitable gas- tight and explosion- proof type; and

(c) all other necessary precautions shall be taken to prevent leakage of flammable vapours and their exposure to open flames, fires or sparks.

8.3.4 Main storage

Main storage facilities for volatile flammable liquids shall be constructed and installed in accordance with the latest edition of:

(a) B 700, "Oil Tanks";

(b) BS 2654, "Specification or the manufacture of vertical steel welded non-refrigerated storage tanks with butt- welded shells for the petroleum industry; and

(c) NFIPA 30, "Flammable and combustible liquids Code".

Such storage may be:

(a) outside above ground;
(b) in a separate outside storage building;
(c) outside underground; or
(d) inside underground.

8.3.4.1 Outside above ground bulk storage tanks

Above ground bulk storage tanks shall:

(a) be limited in capacity, construction and exposure as approved by the Guyana Fire Service Department; and

(b) not be located 90 m from any building or structure not being an essential part of the building storage installation.

Note: Agricultural or science laboratories in primary or tertiary schools, or other experimental laboratories, shall be exempted from the above requirements with the approval of the Guyana Fire Service Department subject to the adoption of appropriate safety measures.

8.3.4.2 Outside storage buildings

All outside storage buildings shall:

(a) be of non-combustible construction or better; and

(b) not have any openings in the enclosing walls within 3 m of adjoining property lines or with a fire exposure of 3 m from any building or structure not part of the installation.

Note: The Guyana Fire Service Department may require greater fire separation or may limit storage capacities under severe exposure hazard conditions when necessary. This is to enhance, public safety.

8.3.4.3 Outside underground storage tanks

An outside underground storage tank shall:

(a) be buried underground with 600 mm earth cover, or 100 mm reinforced concrete cover, in a location that does not undermine any footings or adjacent buildings; and

(b) be 3 m to a property boundary and limited in capacity proximity to other buildings and adjacent boundaries as follows:

Table 5
Capacity of outside underground storage tanks for volatile flammable liquids

Fire separation	Quality of storage (L)
Less than 3m to another building on the same site	2,500
3m to less than 6m	13,500
6m to less than 7.5m	27,000
7.5m to less than 9m	54,000
9m to less than 12m	90,000
12m to less than 15m	225,000
15m or more	Unlimited

8.3.4.3.1 Venting of tanks

All storage tanks whether inside or outside, above ground or underground, shall be vented to the open air so that:

(a) each tank shall have a vent pipe independent of all other piping and of ample size to prevent abnormal pressure building up during fillings, with 32 mm internal diameter, and arranged so that it drains back to the tank; and

(b) vent pipes shall not be located not close to any opening in any building. It shall be 1 m, and terminate in a U-bend facing downwards to prevent rain penetration, and shall be fitted with a flame arrestor.

8.3.4.3.2 Anchoring down of storage tanks

In any areas where the ground water level is likely to be above the bottom of the tank at any time of the year, storage tanks shall be securely anchored down in an approved manner. In such areas of high water tables, it is preferable that underground tanks, as well as above ground tanks be set on saddles, shaped to the contour of the bottom of the tanks, constructed of concrete or block masonry.

8.3.4.3.3 Special high-hazard areas

Where the Guyana Fire Service Department considers it warranted, especially in urban areas or other high-hazard areas, underground tanks shall be required to be:

(a) placed inside concrete pits, on saddles, anchored down and the whole of the space between the concrete walls of tank pit and the metal tank itself filled to the underside of top slab with dry sand; and

(b) constructed preferably in-situ, of reinforced concrete, 100 mm thick walls and floor, and with the top of 100 mm thick reinforced concrete removable slabs.

8.3.4.3.4 Filling of storage tanks

All storage tanks, whether above or below ground level shall be filled only through proper fill pipes, at a point outside and at least 1 m from any building. All fill terminals shall close tight when not in use.

Note: Filling points may be located under the driveway roof of motor fuel service stations where such roof is supported on non-combustible construction and there are no side walls.

8.3.4.3.5 Monitoring of ground water

Adjacent to underground tanks of 5.77 L or more, a 150 mm diameter perforated pipe shall be installed vertically in the sand or gravel backfill to the full depth of the tank excavation, with a removable cover for inspection designed to withstand traffic over the tank area. A single pipe may serve other tanks provided it will monitor leakage from the other tanks.

8.3.4.3.6 Out of service underground tanks

Tanks which are out of service shall be treated as follows:

(a) **Tanks out of service for 3 months:** No special precautions, except they shall be inspected by the authority having jurisdiction before they are refilled;

(b) **Underground tanks out of service for over 3 months but required for use at some other date:** Both the vents and fill terminals shall be capped and sealed with concrete. Tanks shall be inspected before re-use.

(c) **Underground tanks permanently abandoned:** The tanks shall either be completely removed, or be filled with sand.

8.3.4.3.7 Inside underground storage

An inside underground tank shall be located 600 mm below the level of the lowest floor of the building in which it is located, or any building within 3 mm of the tank. Such tanks shall not be located under the footpath or beyond the building line. The maximum capacity of any inside underground tank shall be not more than 2,000 L.

8.4 Liquefied gas

8.4.1 General requirements

The provisions of this sub-section shall apply to the design, construction, location, installation and operation of petroleum, propane, butane and other gas facilities stored in liquid state under pressure for use in buildings.

Notes:

1. Refineries, tank farms and utility gas plants shall be subject to special approvals in accordance with accepted engineering practice and/or covered in any relevant Standards or Codes.

2. There are many other types of flammable gases stored and used from pressure bottles, such as liquid oxygen, acetone/acetylene, methane, compressed natural gas (CNG) and others with differing "trade names" of a similar character.

3. See the latest edition of the relevant Barbados National Standards:

(a) BNS 126 – Liquefied gas: Safety requirements:

(i) Part 1 - Storage of liquefied petroleum gas at refineries and bulk plants.

(ii) Part 2 - Industrial, commercial and domestic bulk storage.

(iii) Part 3 - Bulk transportation of liquefied petroleum gas.

(iv) Part 4 - Filling, handling, storage, transportation and location of portable containers for Liquefied Petroleum Gas (LPG).

(v) Part 5 - Liquefied Petroleum Gas – Transfer of liquids.

8.4.2 Classification of systems

Systems for the storage and use of LPG and other gases shall be classified as:

(a) cylinder or bottled gas systems;

(b) above ground tank systems other than bottled gas systems; and

(c) underground tank systems.

8.4.3 Cylinder or bottled gas systems

A container or cylinder of bottled gas for domestic or commercial use shall:

(a) not exceed 5,000 L equivalent water capacity;

(b) be tested and approved by an accredited testing authority and identified in accordance with the Ministry of Transport and Works requirements;

(c) be installed above ground, with approval values, flexible connectors, piping and safety devices; and

(d) when approved by the Guyana Fire Service Department shall be installed for use inside buildings for industrial purposes or in connection with construction, repair or alteration operations.

8.4.4 Above ground tank systems

Above ground tank systems shall be:

(a) located with respect to allotment boundaries and buildings on the same lot as specified in **Table 6**;

(b) constructed and tested in accordance with the **Regulations for unfired pressure vessels**; and the installation, valves, accessories, piping, vaporisers and safety devices shall be in accordance with accepted engineering practices.

Table 6
Separation distances for tank container systems for liquid petroleum and other gases

Equivalent water capacity	Minimum distances in metres		
	From buildings and boundaries above ground	Between containers	
		Above ground	Below ground
Less than 550 (2)	3	None	None
550 to 1,100	3	None	None
2,200 to 8,800	7.5 (3)	7.5 (3)	1
8,800 to 115,000	15	15	2
115,000 to 2,000,000	15	22.5	¼ of sum of diameters
Above 2,000, 000	15	15	Of adjacent containers

8.4.5 Underground tank systems

Underground tanks systems shall be buried 600mm below ground level, and when required shall be anchored or weighted to prevent floating as specified in **7.6.5** for volatile liquids storage tanks. All containers shall be given a protective coating of hot-dip galvanising, red lead and asphalt, or other suitable corrosion – resistant protection. Fire separation for other buildings on the same lot and property boundaries shall be as follows:

(a) The Guyana Fire Service Department may require greater fire separations or greater limitations of storage capacity that is specified in **Table 11** when necessary for public safety;

(b) At a consumer site, if the aggregate water capacity of a multi container installation comprised of individual containers having a water capacity of less than 550 litres is 1100 litres or more, the minimum distance shall comply with the appropriate portion of **Table 6** applying the aggregate capacity rather than the capacity per container; and

(c) If more than one such installation is made, each installation shall be separated from any other installation by 7.5m. Do not apply the minimum distance between above ground containers to such installations.

8.4.6 Above ground containers

In the case of above ground containers installed adjacent to buildings:

(a) Portable DOT Specification cylinder containers shall be located and installed so that the discharge from the container safety relief device is 1m horizontally away from any building opening below the level of such discharge, and shall not be beneath any building unless the space is well ventilated to the outside and is not enclosed for more than 50% of its perimeter. The discharge from container safety relief devices shall be located 2m in any direction away from openings into sealed combustion system appliances or mechanical ventilation air intakes.

(b) ASME Specification containers of less than 550L water capacity shall be located and installed so that the discharge from safety relief devices shall not be terminated in or beneath openings below the level of such discharge, and not less than 2m in any direction away from openings into sealed combustion system appliances or mechanical ventilation air intakes.

(c) The filling connection and the vent from liquid level gauges not DOT or ASME containers filled at the point of installation, shall be than 3m in any direction away from air openings into sealed combustion system appliances or mechanical ventilation air intakes.

(d) This distance may be reduced to 3m for a single container of 5,000 water capacity or less, provided such container is 7.5 m away from any other LPG as container of more than 550 water capacity.

8.4.7 Labelling

All inlet and outlet connections except safety relief valves, level and pressure gauges shall be labelled to designate whether they communicate with vapour or liquid space and the tanks shall be marked with a securely attached label and name plate identifying the system, working pressure, vapour pressure of the contents and permissible liquid level.

8.4.8 Installation and operating instructions

Complete installation, operation and maintenance procedures and instructions shall be supplied by the manufacturer/supplier for the personnel responsible for the use of system/installation.

8.4.9 Grounding (earthling)

All ground tanks exceeding 5,000 equivalent water capacity shall be permanently and effectively grounded electrically.

8.5 Hazardous chemicals and radioactive material

8.5.1 General requirements

Hazardous chemicals and radioactive material shall not be stored or used in any process without the approval of the Ministry of Health, Ministry of Labour and Human Services and the Guyana Fire Service Departments.

Note: See relevant latest edition of National Standards for the storage, handling and use of hazardous chemicals and radioactive materials.

For other advice, see the latest edition of:

(a) BNS 42 Glossary of terms relating to chemical and radiation hazards and hazardous chemicals.

(b) BNS 45 Classification of hazardous chemicals and chemical products.

(c) BNS 46 Classification of dangerous goods.

8.6 Pyroxylin plastics

8.6.1 General provisions

Except for the manufacture, use or storage of nitro-cellulose film or the incidental storage of articles manufactured from pyroxylin plastics offered for sale in shops, the storage, handling or fabrication of pyroxylin plastic whether in raw material, processed finished product or scrap, shall only be approved subject to special safety precautions specified by the Guyana Fire Service Department.

8.6.2 Storage facilities

A building used for the storage, manufacture, and fabrication of pyroxylin plastic in quantities of more than 45kg shall not:

(a) be located within a building of Occupancy Classification other than F-Factory or H- Hazardous;

(b) be located within 15m of the nearest wall of any other building; and

(c) contain pyroxylin plastic in quantities exceeding 450kg in buildings where paints, varnishes or lacquers, matches, resin, oils, hemp, cotton, explosives, garments or other materials of a highly flammable nature are manufactured or stored.

8.7 Use and storage of flammable film

8.7.1 Nitro- cellulose film

The storage and use of nitro- cellulose shall only be permitted in premises with adequate fire safety precaution as specified by the Guyana Fire Service Department. These requirements shall not apply to film having a cellulose acetate or other similar slow-burning base marked as **"SAFETY FILM".**

8.7.2 Enclosure of projection rooms

Motion picture machine projecting ribbon- type nitro-cellulose acetate or other film in conjunction with electric arc, xenon or other light source projection equipment which develops hazardous gases, dust or radiation, shall be enclosed in a room constructed in accordance with the requirements of the Guyana Fire Service Department.

8.8 Combustible fibre

8.8.1 General provisions

These provisions shall apply to all buildings and structures involving the storage or use of finely divided combustible vegetable or animal fibre and thin sheets or flakes of such materials involving flash fire hazard, including among others: cotton, shredded paper, hemp, sisal, jute, kapok, paper or cloth in the form of scraps and clippings in excess of 500kg.

8.8.2 Construction requirements

All buildings for the storage of combustible fibre shall be constructed within the limits of height and area specified in **3.1**.

8.8.3 Special limits

A single room or space shall be 450m^2 in area or more than 1400m^3 in volume unless of Type 1- Fireproof Construction.

8.8.4 Floor loads

The floors of all buildings used for the storage of combustible fibre shall not be loaded in excess of ½ the safe load capacity of the floor, nor shall such materials be piled more than $^2/_3$ of the storey height.

8.8.5 Salvage doors

Every exterior wall shall be provided with a door to each storage compartment arranged for quick removal of the contents.

8.8.6 Wall openings

All openings in outside walls shall be protected with 1 hour fire door and fire window assemblies.

8.8.7 Roof openings

All skylights, monitors and other roof openings shall be protected with galvanized wire or other corrosion- resistant screens with 6 meshes per cm^2 or with wired glass in fixed frames.

8.8.8 Boiler rooms

All power and heating boilers, and furnaces shall be located in detached boiler house or in a segregated boiler room enclosed in 3 h fire-resistance rated construction with direct entrance from the outside, except that rooms containing gas- fired heating equipment shall have openings into the warehouse protected with 1 ½ h fire doors or their equivalent.

8.8.9 Fire protection

First-aid fire protection equipment shall be provided consisting of cakes, pails, bucket pumps and portable chemical extinguishers as well as standpipes. Where necessary, a system of outside hydrants on ring main with outlets and hoses shall be provided.

8.8.10 Housekeeping

Ashes, waste, rubbish or sweepings shall not be kept in wood, combustible receptacles, and not be allowed to accumulate at any point on the premises, but shall be removed from the premises daily.

8.8.11 Open storage

(a) Only temporary open storage of combustible fibre shall be permitted on the same premises with a fibre warehouse and shall be kept covered on top and side with tarpaulin secured in place.

(b) Not more than 200m^3 of fibre shall be stored in the open and fire- extinguishing equipment shall be provided as directed by the Guyana Fire Service Department.

8.8.12 Exemptions- Use of special treatments

When combustible fibre packed in special non- combustible containers or when packed in bales covered in wrappings to prevent ready ignition, or when treated by suitable chemical dipping or spraying processes to eliminate flash- fire hazard, the restrictions governing combustible fibre shall not apply.

8.9 Combustible dusts, grain processing and storage

8.9.1 General provisions

These provisions shall apply to all buildings in which materials producing flammable dusts and particles which are readily ignitable and subject to explosion hazards are stored or handled, including, among others grain bleachers and elevators, malt houses, flour, feed or starch mills, wood floor manufacturing and the manufacture or storage of pulverised fuel and similar uses.

8.9.2 Construction of storage structures

Such buildings or structures shall be of Type 1- Fireproof Construction, in which case its heights and areas shall be unlimited; or Type 2- Frame Construction if it is on an isolated site and the height is 10m.

8.9.3 Grinding rooms

A room or space for grinding or other operations producing flammable dust shall be enclosed with floors and walls of 2 h fire rating when the area is 250m^2 and 4 h fire rating when the area is 250m^2.

8.9.4 Conveyers

All conveyors, chutes, piping and similar equipment passing through the enclosures of such rooms or spaces shall be dirt and vapour tight and of non- combustible materials.

8.9.5 Explosion relief

Means of explosion relief shall be provided as specified, or such spaces shall be equipped with the equivalent mechanical ventilation complying with the relevant Mechanical Code.

8.9.6 Separation of grain elevators and the like

Grain elevators, malt houses and buildings shall be located within 10m of property boundary lines or other buildings on the same lot.

8.10 Paint spraying

8.10.1 General

These provisions shall apply to the construction, installation and use of buildings and structures, or parts thereof for the spraying of flammable paints, varnishes and lacquers or other flammable materials, mixtures or compounds used for painting, varnishing, staining or similar purposes.

8.10.2 Location of spraying processes

Such processes shall be conducted in a spraying space, spray booth or spray room or shall be isolated in a detached building.

8.10.3 Construction of spray spaces, booths and rooms

All spray spaces, booths and rooms shall be ventilated with a suitable exhaust system to prevent the accumulation of flammable mist or vapour and:

(a) constructed with walls, partitions and ceilings lined with non-combustible materials;

(b) floors shall be water- proofed and drained in an appropriate manner, but not connected to the building drainage system or the public sewer; and

(c) when spray spaces are not separately enclosed, non-combustible spray curtains shall be provided to restrict the spread of fire.

8.10.4 Paint storage rooms

Spraying materials shall be stored in quantities of:

(a) not more than 75 L in cabinets ventilated at top and bottom;

(b) more than 75 L but not more than 400 L in double- walled non-combustible cabinets vented directly to the outside air;

(c) more than 400 L in an enclosure of not less than 2 h fire- rating, or in a separate external storage building; and

(d) more than 100L in an isolated storage building; and or more than 10L of spraying material shall be stored in a building in which pyroylin products are manufactured or stored.

8.10.5 Ventilation of spraying processes

(a) The ventilation system shall comply with the necessary provisions, and shall be adequate to exhaust all vapours, fumes and residues of spraying material directly to the outer air;

(b) Fresh air shall be admitted to the spraying spaces in such a manner as to avoid short- circuiting of the air in work spaces and to provide air movement with a velocity of $30m^3$ per minute at the face of the spray booth; and

(c) Unless equipped with explosion proof motors with non-ferrous blade fans, mechanical exhaust equipment shall be located outside of spray places.

8.10.6 Fire protection in spraying areas

(a) Spray, dip and immersing rooms and spray material storage rooms which are not separated from other occupancies by 3m or enclosed with 2h fire rated construction, shall be provided with sprinkler protection.

(b) where buildings containing such rooms are not equipped with an automatic fire sprinkler system, the sprinkler heads shall be supplied from the building domestic water supply.

8.11 Dry – cleaning establishments

8.11.1 General provisions

All dry- cleaning by immersion and agitation shall be carried out in closed machines, installed and operated by trained operators in accordance with the applicable rules and standards.

8.11.2 Classification

For the purpose of this Code, dry- dyeing establishments shall be classified as follows:

(a) **HIGH HAZARD:** Establishments which use gasoline or other solvent having a flash point below 38^0C in quantities of 12 L, or more than 200 L of flammable solvents with a flash point between 38^0C- 60^0C;

(b) **MODERATE HAZARD:** Establishments using less than 12 L of volatile flammable with a flash point of less than 38^0C less than or 200 L of solvent with a flash point between 38^0C -60^0C; and

(c) **LOW HAZARD:** Establishments using solvents other than volatile flammable liquids or solvents with a flash point of 60^0C in cleaning and dyeing operations.

8.11.3 Construction of high hazard dry-cleaning plants

High hazard dry- cleaning plants shall be constructed:

(a) of Type 1- Fireproof Construction not more than 1 storey in height with solid floors and roofs, and without openings other than those required for egress and ventilation purposes. Such buildings shall not be used for any other purposes;

(b) with a roof structure without attic or concealed spaces and with a pivot type skylight or other vent complying with **7.1** arranged to release outwardly under explosion pressure;

(c) with a floor finish of water-resistant, non-combustible material with non- sparking surface elevated above the adjoining levels and with door sills 250mm in height. There shall not be openings, vaults or pits below the floor; and

(d) with exterior walls having a fire separation of 10m constructed of solid masonry with at least 2 sides of the building not enclosed with blank walls. Exterior doors and windows shall have ¾ h fire rating, and the windows shall be pressure releasing to comply with **7.1**.

8.11.4 Boiler rooms separation

Boiler rooms and heating equipment for high hazard dry cleaning plants shall be separated from drying rooms, dry cleaning and dry dyeing rooms with unpierced walls of 4 h fire rating and in moderate hazard establishments with solid walls of 2 h fire rating, or such boiler rooms shall be located in a separate building.

8.11.5 Construction of moderate hazard dry-cleaning plants

(a) Moderate hazard dry cleaning plants shall be located in buildings or structures of any Type of construction subject to the fire resistance requirements of **7.2** and the height and area limitations for building of Occupancy Group H- High Hazard.

(b) The room or space in which such operations are conducted shall be enclosed in a 2 h fire rated construction with 2 means of egress from each dry- cleaning or dry dyeing room or space.

8.11.6 Construction of low hazard dry- cleaning plants

Low hazard dry- cleaning plants shall be constructed of any Type of construction within the height and area limitations of **7.2** for Occupancy Group B- Business buildings except that such uses shall not be located in basement nor in a building used for Occupancy Group A- Assembly or I- Institutional.

8.11.7 Ventilation

(a) In high hazard dry cleaning plants, rooms and spaces shall have mechanical ventilation capable of 20 changes of air per hour

(b) In moderate hazard plants, mechanical ventilation systems shall have sufficient capacity to ensure 10 changes of air per hour.

(c) In low hazard plants, mechanical or natural ventilation shall be provided by means of fans, pipes and ducts to ventilate drying tumblers, drying cabinets and similar equipment directly to the outside air.

8.11.8 Solvent storage

(a) Volatile flammable solvents with a flash point below 24^0C shall be stored underground.

(b) Interior above ground storage shall be permitted for solvents with a flash point above 24^0C, provided the aggregate quantity of such solvent in use in the system and in storage is not more than 2000 L and the capacity of any individual tank is not more than 1,000 L.

8.11.9 Fire protection

Every dry-cleaning room and dry room employing high and moderate hazard solvents shall be protected with a fire protection system consisting of automatic sprinklers, manually controlled steam- blankets, carbon dioxide flooding systems or other suitable fire extinguishing equipment.

8.12 Public garages

8.12.1 General provisions

Public garages shall comply with the applicable requirements of this Sub-clause. The portions of such buildings and structures in which gasoline, oil and similar products are dispensed shall comply with **7.7.8**. The portions in which motor vehicles are required shall comply with **7.7.10** and the portions in which paint spraying is done shall comply with **7.6.6**.

8.12.2 Construction

All public garages shall be classified as storage buildings (Occupancy Group S) and shall conform to the height and area limitations of, except as herein specifically provided. The areas used for dispensing gasoline in such building shall be located on the ground floor and shall comply with **7.7.6**.

8.12.3 Basements

The ground floor construction of public garages with basements shall be constructed with 2 h fire resistance rating and shall be water and vapour – proof. Any openings in the floor shall be protected by a curb or ramp 150mm high above the floor to avoid the accumulation of explosive liquids or vapours and prevent them from spilling to the lower floor. There shall be 2 means of egress from such areas, one of which shall lead directly to the outside independent of the exitways serving other areas of the building.

8.12.4 Mixed occupancy

A public garage shall not be located within or attached to buildings occupied for any other use, unless separated from other use by walls or floors complying with **7.2**. Such fire separation shall be continuous and unpierced by openings except that:

(a) door openings equipped with self- closing doors shall be permitted; and

(b) in buildings of single occupancy, non-rated doors shall be permitted between garage area and salesroom or offices that are associated with the garages, subject to the area limitations of **7.2**.

8.12.5 Roof parking of motor vehicles aeroplanes or helicopters

The roof of a building shall not be used for the parking or storage of motor vehicles, aeroplanes or helicopters unless the building is of Type 1- Fireproof construction, and:

(a) where used for parking motor vehicles, the roof shall have a parapet wall or guard rail 1m in height and a wheel guard 150mm in height, located so as to prevent any vehicle from striking the parapet wall or guard rail; and

(b) the use of roof for aeroplane/helicopter storage and landing shall be subject to the approval of the Ministry of Public Works, Communication and Transportation.

8.12.6 Floor construction and drainage

Floors of public garages and aeroplanes hangers shall be graded to drain through oil separators or traps to avoid accumulation of explosive vapours in building drains or sewers. The floor finish shall be of concrete or other suitable non- absorbent, non-combustible materials.

All public garages and aeroplane hangers shall be provided with mechanical or natural ventilation adequate to prevent the accumulation of carbon monoxide or exhaust fumes in excess of one part in 10,000 or 0.01% or the concentration of gasoline vapour in excess of 20% of the lower explosive limit. The Building Authority may require a test by a qualified testing laboratory to determine the adequacy.

8.12.7 Below ground garages

Enclosed, partly below ground or basement, public garages shall be equipped with mechanical ventilation adequate to provide 6 air changes per hour. The ventilation system shall be operated at all times if the garages area are occupied by people.

8.12.8 Repair shops or rooms

(a) When motor vehicles are to be operated or engines are run for test purposes or minor adjustments, provisions shall be made to extract the exhaust fumes to the outer air by means of positive induced draft. The discharge shall be into 2.5m above the adjacent ground level in the exterior of the building and located so as not to create hazard to adjoining properties.

(b) When necessary to discharge across a walkway or private thoroughfare, the discharge opening shall be carried to a height of 7.5m above the ground level or to a height of 100mm above the highest point of the wall of the building or structure on which it is located.

8.12.9 Pit

Pits shall not be installed in below- ground floors and pits in ground and any upper storeys shall be provided with mechanical ventilation adequate to provide ventilation required under **7.7.5**. The ventilation system shall be operated at all times if the pits are occupied by workmen or other personnel.

8.13 Motor fuel service stations

8.13.1 Construction

Buildings and structures used for the storage and sale of motor fuel oils shall be of any Type of construction within the height and area limitations of **7.2** for Occupancy Group B- Business buildings. The canopies and supports over pumps the serve equipment when located 6m from interior boundary lines shall be constructed of non- combustible materials and heavy timber, of 1 h Fire- resistance rated construction.

8.13.2 Exceptions

Plastic materials can be used as canopies over pumps when:

(a) the canopies are located 3m from any building on the same property and face yards or streets 12m wide; or

(b) the aggregate area of plastic in each canopy does not exceed $100m^2$.

8.13.3 Opening protective

All permissible openings in walls with a fire separation of 3m shall be protected with fire windows or fire doors complying with **7.2**, except doors in such walls giving access only to rest rooms.

8.13.4 Basements

Motor fuel service stations shall not have cellars or basement. When pits are provided they shall be vented as required in **7.6.5**.

8.13.5 Gasoline storage

All volatile flammable liquid storage tanks shall be installed below ground and vented as specified in **7.3**. Gasoline may be stored or handled above ground in approved safety cans of 20 L each.

8.13.6 Location of pumps

Gasoline pumps or other mechanical equipment shall not be installed so as to permit servicing of motor vehicles standing on a public street or highway.

8.14 Motor vehicle repair shops

8.14.1 General requirements

All buildings or shelters designed and used for the repair and servicing of motor vehicles, motor boats, tractors, aeroplanes or other automotive machinery or means of transportation shall be subject to the limitations of **7.2** for Occupancy Group S- Storage buildings. Such buildings shall be used solely for the purpose.

8.14.2 Enclosure walls

Exterior walls, when located within 2m of interior boundary lines or other buildings shall not have openings therein.

8.14.3 Handling of volatile flammable

Volatile flammable materials shall be stored in containers with handles as provided in **7.7.12**.

8.14.4 Ventilation

All rooms and spaces used for motor vehicle repair shop purposes shall be provided with mechanical or natural ventilation adequate to prevent the accumulation of carbon monoxide or exhaust fumes or other injurious gases in excess of one part in 10,000 or 0.01%, or the concentration of gasoline vapours in excess of 20% of the lower explosive limit.

8.14.5 Fire prevention

Open gas flames, welding apparatus, or other equipment likely to create an open flame or spark shall not be located in a room or space in which flammable liquids or highly combustible materials are used or stored.

8.15 Theatres for stage performances

8.15.1 Applicability

These provisions shall apply to all places of public assembly and parts of buildings or structures of Occupancy Classification A-1 -Theatres, with an occupancy load of more than 500 persons, and which have a fixed stage, backstage area, and/ or rigging loft.

8.15.2 Associated uses

A theatre shall not be permitted in a building of Occupancy Group H- High Hazard.

8.15.3 Number of exitways

A theatre shall:

(a) be provided with the number of exitways as specified in **Table 7** and **Sub- section 8** complying with the travel distances specified and the minimum aggregate width specified in **Clause 9** occupancy load, located remote and independent of each other and on opposite sides of the area served.

(b) face front on at least one street at which the main entrance and exitway discharge are located, and:

(i) the total capacity of such main exitway, shall be 1/3 of the total required width of all exitways from the auditorium; and

(ii) in addition to the main floor entrance and exitway, emergency discharge door shall be provided on both sides of the auditorium which lead directly to a street, or through a passageway to the street independent of other exitways, or to a discharge court as specified in this Code.

(c) have each tier above the main floor of the theatre or auditorium:

(i) connected to the lobby on the main floor by 2 interior stairways located on opposite sides of the structure; and

(ii) provided with emergency exitways from both sides with direct egress to the street, or to an independent passageway, or to a discharge court, such that there is no communication from any portion of the building to the emergency exitways except from the tier for which such exitway is exclusively intended.

Note: Although Clause 9 covers means of egress from all types of buildings and occupancies, the above provisions deal exclusively with theatres. Should there be any apparent conflict in the provisions, the more stringent requirements shall apply.

Table 7

Minimum number of exitways in theatres

Occupancy load per floor	Minimum number of exitways
Not more than 500	2
501 to 900	3
901 to 1800	4
Over 1800	5

8.15.4 Discharge courts

All discharge courts shall be 2m wide for the first 600 persons to be accommodated or fraction thereof, and shall be increased 300mm in width for each additional 250 persons. Such discharge court shall extend sufficiently in length to include the side and rear emergency exitways from the auditorium.

8.15.5 Width of exitway doors

The maximum width of a single exitway door shall be 1.1m and the minimum width of double doorways shall be 1.85m.

8.15.6 Hardware

Latches or bolts on all means of egress doorways shall be of a self- releasing, panic-roof type complying with **Clause 9**.

8.15.7 Fixed seats

In all theatres and similar places of assembly except churches, stadiums and reviewing stands, individual fixed seats shall:

(a) have separating arms with a width of 510 mm and a minimum width of 485mm; and

(b) be arranged in rows and width measured horizontally between rows of:

(i) 450mm where rows are served by aisles at each end; or

(ii) 550mm where rows are served by an aisle at one end.

8.15.8 Box seats

In box seats or “loges” with level floors, the seats shall not be fastened down when not more than 6 in numbers per row.

8.15.9 Number of seats between aisles

Aisles shall be located so that there are not more than:

(a) where rows of seats are served by an aisle at each end: 50 seats between aisles; and

(b) where rows of seats are served by an aisle at one end only: 16 seats per row.

8.15.10 Dimensions of theatres aisles

In theatres and auditoriums:

(a) aisles shall not exceed a gradient of 1 in 7;

(b) the width of longitudinal aisles at right angles to rows of seats:

  (i) seats on both sides of the aisle shall be 1m, increasing in width 20mm for each meter of length of aisle from its beginning to an exitway door, or to a cross aisle or between cross aisles; and

  (ii) seats on one side only, shall be 760mm, increasing as above by 20mm for each meter of length.

(c) when there are 27 or more rows of seats on the main floor of theatres, cross aisles shall be provided so that a block of seats shall not have more than 22 rows;

(d) a cross aisle shall:

  (i) be not less than the widest aisle with which it connects or the width of exitway which it serves, but 1.1m wide, or when adjacent, the entrance shall be 1.2m wide; and

  (ii) be provided in balconies and galleries of theatres, between each block of 10 rows of seats;

(e) where an aisle converge to form a single path of travel, the required egress capacity of that path shall be not less than the combined required capacity of the converging aisles.

Notes 1. Aisle width shall provide sufficient egress capacity for the number of persons accommodated by the catchment area served by the aisle. In establishing catchment of area, the assumption is made that there is a balanced use of all means of egress with the number of persons in proportion to egress capacity.

2. A proportion of viewing position in an auditorium shall be available for use by persons in wheel chairs. Requirements for access and toilet facilities for disabled persons are specified in Sub- Section 12.

8.15.11 Balcony steps

Steps shall be provided in balconies and galleries only, and such steps shall extend the full width of the aisle with treads and risers complying with which shall be illuminated by lights on both sides or by a step light or otherwise to ensure an intensity of 0.1 lux.

8.15.12 Railings

Metal or other non-combustible railings shall be provided on balconies and galleries:

(a) at the fascia of boxes, balconies and galleries: Not 750mm in height, and 910mm in height at the foot of steps;

(b) along cross aisles: 520mm in height except where the backs of the seats along the front of the aisle project 520mm; and

(c) where seating is arranged in successive tiers, and the height of rise between platforms exceeds 450mm: 520mm in height along the entire row of seats at the edge of the platform.

8.15.13 Capacity of theatre foyers

In every building of Occupancy Classification A-1 Theater for theatrical use with stage and scenery loft:

(a) a foyer or lobby shall be provided with a net floor area exclusive of stairs or landings, of $0.14m^2$ for each occupancy having access there to; and

(b) the use of foyers and lobbies and other available spaces for harbouring occupants until seats become available shall not encroach upon the floor area of the foyer or lobby, or upon the required clear width of front exitway.

8.15.14 When the foyer or main lobby is not directly connected to the public street, an unobstructed corridor or passageway which equals the required minimum width of the main entrances and exitways shall be provided, and means of egress leading from the auditorium through the foyer or lobby and any corridors or passageways shall not have a steeper gradient than 1 in 14.

8.15.15 Construction of foyer walls

The walls of foyers and lobbies:

(a) where they separate the foyer or lobby from the auditorium and other adjoining rooms and spaces of theatres, shall have a 2 h fire- resistance rating; and

(b) shall not have a mirror placed so as to give an appearance of a doorway, exit or passageway.

8.15.16 Waiting spaces

Waiting spaces for harboring occupants shall be located only on the ground or auditorium floor. Separate exitways in addition to the required theatre exitways shall be provided from the waiting space based on occupancy of 3 persons per m^2 of waiting area.

8.15.17 Trim, finish and decorative hangings

All permanent acoustic insulating and similar materials and temporary hangings shall comply with the flame- resistance requirements of **7.2**. Mouldings and decorations, and proscenium openings shall be constructed entirely of non-combustible materials.

8.15.18 Theatre stage construction

Every stage for theatrical performances which is equipped with portable or fixed scenery, lights and mechanical appliances shall be constructed as follows:

(a) walls separating the stage, backstage area and loft from other parts of the building, shall have 2 h fire- resistance rating and extend from foundation level to 1.2m above the roof, if the roof does not have a 2 h fire- resistance rating;

(b) the entire stage floor, except that portion used for the working of scenery, traps and other mechanical apparatus for the presentation of a scene, shall have 2 h fire- resistance rating construction. All openings through the stage floor shall be equipped with tight fitting, solid wood trap doors 75mm in thickness or other materials of equal structural and fire-resistance properties;

(c) the rigging loft, fly galleries and pin rails shall be constructed or of non-combustible materials; and

(d) footlights and border lights shall be installed in troughs constructed of non-combustible materials. The switchboard shall be so located as to be readily accessible at all times and the storage or placing of stage equipment against it shall be prohibited.

8.15.19 Exterior doors off- stage

All exterior openings which are located on the stage for means of egress or loading and unloading purposes which are likely to be opened during occupancy of the theatre, shall be constructed with vestibules to prevent air draughts into the auditorium.

8.15.20 Proscenium wall

(a) The distance between the top of the proscenium opening and the ceiling of the stage shall be 1.5m.

(b) There shall not be other openings in the wall separating the stage from the auditorium except:

(i) the main proscenium openings;

(ii) two doorways at the stage level, one on each side; and

(iii) where necessary, not more than 2 doorways to the musicians' pit from the space below the stage floor.

(c) Each doorway shall be $2m^2$ in area and shall be protected with automatic or self- closing fire door assemblies with a fire rating of 1 h.

8.15.21 Proscenium curtain

The proscenium opening shall be protected with an automatic fire- resistant, smoke- tight curtain designed to resist an air pressure of 9.9 MPA normal to its surface, both inward and outward. The curtain shall withstand a ½ h fire test at a temperature of 925^0 C without the passage of flame. The curtain shall be operated by an automatic heat activated device to descend instantly and safety, and to completely close the proscenium opening at a temperature rise of between 80^0C and 110^0C per minute and by an auxiliary operating device to permit prompt and immediate manual closing of the proscenium opening.

8.15.22 Scenery

All combustible materials used in sets and scenery shall be rendered flame-resistant as per definition.

8.15.23 Stage ventilation

Metal or other non-combustible ventilation, equipped with movable shutters or sashes shall be provided over the stage, constructed to open automatically and instantly by heat activated devices, with an aggregate clear area of opening 1/8 the area of the stage. Supplement means shall be provided for manual operation of the ventilator.

8.15.24 Dressing room and stage exitways

Each tier of dressing rooms shall be provided with at least two means of egress, one of which shall lead directly to an exitway corridor, discharge court or a street. Exitway stairways from dressing and storage rooms shall be unenclosed.

At least one exitway shall be provided from each side of the stage and from each side of the space under the stage and room from each fly- gallery. An iron ladder shall be provided from the gridiron to a scuttle in the stage roof.

8.15.25 Fire protection and fire- fighting equipment

Every theatre shall have fire sprinkler systems and equipment as required by **Clause 8** and as follows:

(a) the automatic fire sprinkler system shall protect all parts of the building except the auditorium, foyer and lobbies, or area in the immediate vicinity of electrical equipment. Such protection shall be provided:

(i) over the stage;

(ii) within the open framework above a stage with no ceiling and when all sprinklers with 57^0C rated heads with baffle plates are installed around the entire perimeter of the stage at points 750mm below the framework nor more than 150mm below the baffle plate;

(iii) under all fly- galleries and over the proscenium opening on the stage side;

(iv) under the stage, if the area has more than 1.3m of headroom at any point; and

(v) in all basements, cellars, workrooms, dressing room, storerooms, and property rooms and toilets, lounge and smoking rooms.

(b) standpipe fire-fighting mains shall be provided with outlets and hose attachments, on each side of the auditorium in each tier, in each mezzanine, on each side of the stage in each tier of dressing rooms and protecting each property store and workroom. Standpipes shall be 65mm in diameter, and shall be equipped with 38mm hose and 10mm nozzles.

(c) portable 10 L fire extinguishers shall be located:

(i) 2 on each tier or floor of the stage;
(ii) 1 in each dressing room; and
(iii) 1 in each work, utility and storage room.

(d) fire axes and fire hooks shall also be provided as directed by the Guyana Fire Service Department and all fire extinguishers and fire tools shall be securely mounted on walls in plain view and readily accessible.

8.16 Assembly buildings other than theatres

8.16.1 General requirements

This sub -section applies to places of public assembly other than theatres with an occupancy load of more than 500 persons as covered in **7.7.12**, including auditoriums, armories, bowling alleys, broadcasting studios, chapels, churches, community halls, dance halls, gymnasiums, lecture halls, exhibition halls, night clubs, rinks, roof gardens and similar occupancies and uses.

8.16.2 Seating

Seating shall be provided:

(a) in rows individually fixed or fixed in rigid units or continuous benches between aisles, as specified in **7.7**; or

(b) by chairs at tables set out to provide convenient access by unobstructed aisles 1m wide which led to exitways.

8.17 Amusement parks

8.17.1 Construction of amusement park buildings

In amusement parks, all accessory buildings and enclosed structures:

(a) shall be constructed to conform to the requirements for use and occupancy in **Clause 7.1** and **7.2**; except

(b) in the case of buildings over 1 storey in height, wall and floor construction shall have a 1 h fire rating.

8.17.2 Amusement devices

The maximum height of any amusement device in which passengers are transported shall be12m in Type 2- Frame Construction or 30m in Type 1 -Fireproof Construction.

8.17.3 Walkways and ramps

Walkways and ramps shall have a slope of 1 in 10, except that when approved non-slip surfaces are provided, the grade shall be increased to a maximum of 1 in 10.

8.17.4 Elevating and conveying equipment

The equipment and operation of all devices and mechanisms for transporting persons shall comply with the requirements of the Ministry of Labour and Human Services.

8.17.5 Tests

All amusement devices used by the public which involve hazardous features shall be installed and operated as directed by the Building Authority and shall be provided with a system of fire hydrants and fire lines with the required water supply, complying with **3.3.1** and other relevant standards.

8.17.6 Stadiums and grandstands

Stadiums and grandstands shall be constructed as required by this Code and in accordance with the latest edition of the following standards:

(a) NFIPA 102 - Assembly Seating, Tents and Membrane; and

(b) NFIPA 701 - Flame Test for Fire- Resistant Textiles and Films.

8.17.6 Handrails

Means of egress stairways shall be provided with a continuous handrail on at least one side, broken only as necessary to provide entrance to the seating platforms.

8.17.7 Spaces under seats

Spaces underneath grandstand seats shall be kept free of all combustible and flammable materials and shall not be occupied or used for other than exitways, except that when enclosed in 1 h fire- resistance rated construction. The Building Authority shall approve the use of such space for other purposes that do not endanger the safety of the public.

8.18 Drive- in motion picture theatres

8.18.1 Access lanes

Separate entrance and exit lanes shall be 3.6m in width, with 6m intervals between access lanes.

8.18.2 Parking spaces

The parking bay for each car shall be 3m ×6m.

8.18.3 Speakers stands

Speakers stands shall be placed between alternate parking base and be capable of being illuminated throughout any performance so as to be easily distinguishable at all times.

8.18.4 Projection booth

The projection booth shall be supported on a structure of non- combustible construction. A motor vehicle shall not be permitted to park within 6m of the projection booth or room.

8.18.5 Toilet facilities

The projection booth shall be provided with a toilet facility.

8.18.6 Lighting

In drive-in motion picture theatres:

(a) **vehicular entrance:** Entrance and exit driveways shall be capable of being fully illuminated by flood lights that are so placed and focused as not to unduly interfere with the vision of drivers;

(b) **internal driveways:** Perimeter access driveways shall be capable of being continuously illuminated to at least 0.5 lux at ground level; and

(c) **flood lights:** The whole of the drive-in theatres including parking bays, access lanes and entrance/exit driveways shall be capable of being illuminated by means of area flood lights providing illumination to 10 lux.

8.18.7 Fire protection equipment

Sufficient portable fire extinguishers shall be provided in readily accessible locations, plainly and visibly identified by signs, at distances of 45m so as to be available to every motor vehicle parking bay. Fire extinguishers shall be mounted on posts or platforms protected from mechanical injury with substantial guards.

8.19 Hotels and motels

8.19.1 General requirements

All buildings and accessory structures erected for or used as hotels or motels shall comply with the requirements of this Code.

8.19.2 Garages

Garages when attached to hotels/motels residential buildings shall:

(a) have the interior faces of walls not of masonry construction; and the ceiling, lined with a material which achieves a 1 h fire rating; and all connecting openings shall be protected with ¾ h fire doors or their equivalent, or with 45mm solid- core wood doors; or

(b) be separated from the hotel/motel buildings except by construction with 2 h fire rating or a space of 6m wide, that roofed-over-passageways with open sides shall be used to connect garages to hotel/motel buildings or dwelling units, if adequately protected at the points of connection to prevent fire spread from the garage.

8.19.3 Required exitways

All exitways in buildings more than 1 storey in height shall be constructed of 1 h fire rating and all storeys above the ground floor shall have at least 2 means of egress complying with **Clause 9**. All exitways from residential quarters shall lead to open spaces of 6m in width which provide direct access to public streets or open spaces.

8.19.4 Driveways, access ways and parking spaces

The arrangement and capacity of driveways, access lanes and parking spaces shall comply with the requirements specified for parking lots.

8.20 Open- deck car parking buildings

8.20.1 General requirements

Open passenger vehicle parking structures are those structures used for the parking and/or storage of passenger motors designed to carry 9 persons, and include the following types:

(a) **ramp- type parking structures:** Those with a series of continuously rising floors or a series of interconnecting vehicle ramps between floors, permitting the movement of passenger automobiles under their own power to and from the street level; and

(b) **mechanical- type parking structures:** Those employing specially designed parking machines, elevators, lifts, conveyors, moving cranes, or other devices for moving passenger automobiles to and from the street level.

8.20.2 General construction requirements

Open-deck car parking structures shall be constructed of non- combustible materials throughout, including structural framing, floors, roofs and walls.

8.20.3 Separations

Open car parking structures shall be erected without exterior walls except that a wall with 2 h fire rating and without openings therein, shall be provided when located within 2m of an interior property boundary unless the boundary, is adjacent to a permanent open space, public park, right-of-way, or similar.

8.20.4 Basements

Basements, if used for parking of vehicles, shall be sprinklered in accordance with the provisions of **Clause 8**.

Notes: 1 Open- deck car parking buildings and office other buildings with basement car park for its tenants.

2. Also there can be exceptions in certain cases: for example, if the "open parking building" is only on one side, usually a street side, and the basement is completely enclosed on all four sides with no openings to upper levels and the only openings are for access or egress of vehicles and these are not below the open side of upper floors, it is not required that such basement be sprinklered.

8.20.5 Petrol dispensing

Areas used for dispensing of any motor fuels in parking buildings shall be located on the ground floor only, and shall comply with the **7.7.8**.

8.20.6 Heights and areas for open car parking buildings

The heights and areas for open parking buildings shall not exceed the limits specified in **7.2**.

8.20.7 Protective guard rails

Wells, shafts and other open exposed spaces shall be enclosed with walls or protected with continuous guard rails 1m in height, except:

(a) at ground floors where there are no basements or floor openings; and

(b) where vehicles are hoisted to the desired level and placed in the parking space by mechanical means, the wall or guard rail shall be omitted on the side of the parking level adjacent to the assisting and placing equipment.

8.20.8 Wheel guards

Wheel guards made of non-combustible materials shall be placed wherever required.

8.21 High rise buildings

8.21.1 Applicability

These provisions shall apply to all buildings with floors more than 6 storeys or 25m above the lowest level of fire service vehicles access, used for human occupancy in buildings of Occupancy Group B- Business, or Occupancy Classification R-1- Residential Hotel or R-2- Residential Apartments.

8.21.2 Maintenance and inspection

All fire protection systems shall be maintained in an operative condition at all times and shall be periodically inspected and tested. Maintenance inspections shall be made quarterly and logged in a journal kept available for inspection.

8.21.3 Fire safety options

All buildings shall be provided with either an automatic fire suppression system or safe areas of refuge in accordance with the following provisions:

(a) **Automatic fire suppression systems**

When provided, the automatic fire suppression system shall be installed throughout the building. The system shall be designed as specified in **Clause 8** as follows:

(i) shut-off valves, and a water flow device shall be provided for each floor of the building;

(ii) sprinklers shall be supplied by at least two risers with a check valve at each connection of the sprinkler system to the riser so that one of the interconnected risers can remain operational should a failure occur in the other riser/main; and

(iii) in addition to the main water supply, a secondary on-site supply of water equal the hydraulically calculated sprinkler design demand plus 350L per minute additional for total standpipe system shall be provided.

This supply shall be automatically available if the principal supply fails and shall have a capacity to supply the fire mains for 30 minutes.

(b) **Concessions when automatic sprinklers are installed**

When an automatic fire suppression system is installed, modifications are permitted as follows:

(a) the type of construction shall comply with **7.2**;

(b) The fire rating of exitway access corridors and vertical separation to tenant spaces:

(i) shall not be required in Occupancy Group B- Business;

(ii) shall be ½ hour Occupancy Group R-1 Hotel- and R-2 -Apartment Buildings, and the wall or partitions shall terminate at the underside of the fire- resistance rated ceiling assembly above.

(c) vertical shafts other than stairway enclosures and elevator hoist-way enclosures may be reduced to 1 h fire rating when sprinklers are installed within the shafts at alternative floors;

(d) the exitway access and common corridor doors need not be fire- rated assemblies as specified, but they shall be self- closing and tight fitting;

(e) the exitway access travel distance may be increased as set out in **Table 8;**

(f) the fire- resistant floor or the floor/ceiling construction shall extend to and be tight against the exterior wall so that the fire- resistant integrity between storeys is maintained. No penetrations or other installations which will impair the fire- resistant integrity of the floor or floor/ceiling assembly shall be permitted; and

(g) a manual fire alarm system (pull boxes) shall be provided.

(c) **Smoke detection systems**

A smoke detector suitable for the occupancy and designed to operate the alarm system and all equipment necessary to prevent the circulation of smoke shall be installed in:

(a) every mechanical equipment room, electrical, transformer, and telephone equipment room, elevator machine room, or any similar room unless such rooms are protected with an automatic fire suppression system; and

(b) each connection to a vertical duct or riser serving 2 or more storeys from return air ducts or plenums of heating, ventilating and/or air conditioning systems, except in Occupancy Group R-Residential occupancies, where a smoke detector may be used in each return, air riser carrying 150m^3 per minute and serving 10 air inlet openings.

(d) **Alarm and communication systems**

Alarms and communication systems shall be provided and so designed and installed that damage to any terminal unit will not render more than one section or zone of the system inoperative.

Note: A single communication system may be designed to serve a public address system, a voice alarm, and fire service communication system.

(e) **Anchorage of mechanical and electrical equipment**

In high- rise buildings, the anchorage of the following mechanical and electrical equipment shall be designed for a lateral force on Cp and or G as required by that Section unless data is approved by the Building Authority substantiating a lesser value:

(a) elevator drive and suspension systems;

(b) emergency power and lighting facilities; and

(c) fire pumps and all other fire protection equipment and systems.

Table 8

Travel distances for buildings with more than one exit

Occupancy group	Maximum travel distance to nearest exit	
	Not sprinklered (m)	Sprinklered (m)
A -Assembly	40	45
B -Business	40	45
F -Factory	40	45
H- Hazardous	15	20
I -Institutional	30	45
M -Mercantile	30	45
R -Residential	30	45
S - Storage	40	60

Note: See 8.15.3 for measurement of travel distance.

8.22 Covered malls

8.22.1 Application

Covered mall buildings shall be designed and constructed in accordance with the general provisions or the special provisions of this Code.

9 Means of egress/escape

9.1 General requirements

9.1.1 Application

This clause specifies sets out requirements for fire escape facilities and the design of stairways and ramps in buildings.

9.1.2 Completion of exits before occupancy

No part of a building shall be occupied or used unless all egress facilities required to serve that part are completed and available for use.

9.1.3 Alternative provisions

When strict compliance with the provisions of this clause is not possible or practicable, alternative means of egress which will achieve the same purpose shall be accepted.

9.1.4 Plans and specifications

Building applications shall include plans for each floor which show the layout, location, construction, size and characteristics of all doorways, stairways, ramps, aisles, corridors, passageways and hallways leading thereto.

9.2 Occupancy load

9.2.1 Calculation of occupancy load

The number of persons accommodated in each storey of a building shall be determined according to the purpose for which the various rooms or spaces are used and the layout of the floor by:

(a) calculating the sum of the numbers obtained by dividing the floor area of the storey or space, including any mezzanine or other area discharging through it, by the number of m^2 per person listed in **Table 9** excluding spaces set aside for:

(i) lifts, stairs, ramps and escalators;

(ii) corridors, hallways, lobbies and the like, provided they are not used as exhibition or separate places of assembly;

(iii) service shafts and the lift, sanitary compartments or other ancillary uses; and

(iv) except where **Table 9** refers to the gross area, fixed furniture or equipment such as shelving or bar or reception counters.

(b) reference to the fixed seating capacity in an assembly room; or

(c) other suitable means of assessing its occupancy load.

Note: The occupants of staff meeting rooms, cafeteria, or similar rooms that are not occupied at the same time as other rooms in the storey or space concerned, shall be omitted from the total occupancy load calculation.

Table 9

Area per person according to use

Occupancy or use	Area per person (m^2)	
A - ASSEMBLY		
(a) Art gallery, exhibition area, museum	4	Gross
(b) Bar, cafe, church hall, dining room	1.5	Net
(c) Court room - Judicial area -	10	Net
Public seating not fixed	1.5	Net
(d) Dance floor	0.3	Gross
(e) Gymnasium	3	Gross
(f) Indoor sports stadium- Arena	10	Gross
(g) Library- Reading space	2	Net
- Storage space	22	Gross
(h) Night club, restaurant	20	Gross
(i) School – General classroom	1	Net
- Multi- purpose hall	2	Net
- Staff room	1.5	Gross
- Trade and practical area	10	Gross
- Primary		
- Secondary	4	Net
(j) Skating rink based on rink/As for workshop area	As for workshop	
Spectator stand, audience viewing area	1.5	Gross
- Standing viewing area	0.3	Net
- Removable seating	1	Net
- Fixed seating	Number of seats	
- Bench seating		
(k) Swimming pool- Pool area	450 mm/person	
(l) Theater or public hall	1.5	Gross
- Fixed seating	Number of seats	
- Removable seating	0.8	Net
(m) Theater dressing room	4	Net
(n) Transport terminal	2	Net

Occupancy or use	Area per person (m^2)	
B - BUSINESS		
(a) Boardroom	2	Gross
(b) Mainframe computer room	25	Gross
(c) Office, including typewriting or document copying	10	Gross
F - FACTORY		
(a) machine shop, fitting shop or like place for cutting, grading, finishing or fitting of metals or glass other than in (b).	10 50	Gross Gross
(b) used in fabrication of structural steelwork or manufacture of vehicles or bulky products.	As determined by the use of the use of the space or equipment	
(c) space in which the layout and use of fixed plant or equipment determine the number of persons who will occupy the space during working hours:		
(i) laboratory	10	Net
(ii) laundry	10	Net
(iii) workshop-Maintenance	30	Gross
I - INSTITUTIONAL		
Dormitory- For children	5	Gross
- For adults	10	Gross
- Day nursery, child-care facility	5	Gross
- Patient treatment area	10	Net
- Waiting room	2	Gross
- Ward	10	Gross
M - MERCANTILE		
Kiosk		
Shop- space for sale of goods	1.5	Net
(a) basement, ground floor or where opening to outside	3	Gross
(b) All other levels	5	Gross
Showroom- Display area, covered mall or arcade	5	Net
Storage, packing or shipping area	10	Gross
R RESIDENTAL		
Hostel, hotel, motel, guest house, boarding house	10	Gross
House, flat, apartment	15	Gross

Occupancy or use	Area per person (m^2)	
S - STORAGE		
- Public garage	30	Gross
- Storage space- General	30	Gross
- Warehouse	50	Gross
OTHER ROOMS AND SPACES		
- Kitchen	10	Net
- Switch room, transformer room	30	Net
- Telephone exchange	30	Net
- Plant room- For ventilation, electrical or other service units	30	Net
- Boilers or power plant	50	Net

9.2.2 Occupancy load notice

A notice indicating the approved occupancy load of any building or space where the area per person is 1 m^2 or less shall be displayed adjacent to the main entrance to that building or space.

9.2.3 Maximum occupancy load

The occupancy load calculated using **Table 9** shall be exceeded only if the approved means of egress provide for the actual number of persons occupying or using the building or space concerned, and that number is included in any occupancy load notice required under **9.2.2**.

9.3 Number of exits required

9.3.1 Buildings permitted to have one exitway

Every building shall have at least one exit from each occupied space within each storey. A single exit is permitted from occupancies, provided the floor area at that storey, the travel distance and height at which the occupancy occurs, do not exceed that specified in **Table 10**.

Table 10

Buildings permitted to have one exit

Occupancy group	Maximum height (Storey (s))	Maximum area (m^2)	Maximum travel distance (m)
A - Assembly	1	150	15
B - Business	3	200	25
F - Factory	2	200	15
H - Hazard	1	150	15
I - Institutional	2	75	10
M - Mercantile	2	150	15
R - Residential	3	-	15
S - Storage	2	200	25

Notes: 1. Provisions for basements and mezzanines are set out in.
2. Additional restrictions for hospitals are also set out in.

9.3.2 Basements and mezzanines

Except in a building of Occupancy Group H - High Hazard, a basement or mezzanine shall have only one exit where:

(a) it is the only basement or mezzanine served by the exit;

(b) the travel distance to the exit does not exceed that specified in **Table 10** for the Occupancy Group concerned; and

(c) the occupancy load of the mezzanine or basement does not exceed 50 persons.

9.3.3 Hospitals with one exit

All sleeping and patient treatment areas in buildings of Occupancy Classification I-2 - Hospitals and Nursing Homes, shall have at least 2 exits unless they are located on the ground floor and the travel distance from any point on the floor does not exceed that specified in **Table 11**.

9.3.4 Buildings with two or more exits

Additional exits shall be provided from each storey in any building not subject to **8.3.1** to **8.3.3** as necessary to meet the requirements for travel distance in 8.4 and exit width in **8.5**.

9.4 Travel distances

9.4.1 Maximum travel distance

The distance of travel from any point on the floor of a building to the nearest exit shall not exceed that specified in **Table 11**.

9.4.2 Dead-end travel

Interior partitions or walls shall be located to form a corridor with dead-end travel of 6 m from any door required for egress purposes from any occupancy served by the corridor to a point where travel in different directions to alternative exits is available.

9.4.3 Measurement of travel distances

Travel distances shall be measured from the most remote point on the floor along the natural and unobstructed line of travel to the exit, as follows:

(a) **fire-isolated exitways:** Where a stairway is required to be fire-isolated under **9.6**, the measurement shall be taken to the protected doorway access to the fire-isolated stairway enclosure or;

(b) **non-fire-isolated exitways:** Where the exitway is not fire-isolated, the measurement shall be taken down the stairs along the line of the stair tread nosing to the exit opening to the outside.

9.5 Dimensions of exitways

9.5.1 Dimensions of stairways

Stairways forming part of an exitway, shall have:

(a) an unobstructed height throughout of 2 m; and

(b) an aggregate width depending on the greatest occupancy load of the storeys served by the stairway, including any mezzanines or other spaces egressing through that storey of:

(i) 1 m for the first 100 persons, plus 300 mm for the next 100 persons, plus 800 mm for each additional 100 persons, or parts thereof.

(c) a minimum width in any stairway as follows:

Notes:

1. Width of stairways may need to be increased to allow furniture or equipment to be moved.

2. Where two or more occupancies have common stairways, the more restrictive requirements shall apply.

9.5.2 Dimensions of ramps, corridors, passageways and doorways

The width of ramps, corridors, passageways and doorways and other parts of required exitways, including horizontal exits in accordance with **9.6.6**, shall be not less than:

(a) in aggregate, depending on the occupancy load of the areas served:

(i) 800 mm for the first 100 persons;
(ii) 250 mm for the next 100 persons, or part thereof;
(iii) 650 mm for each additional 100 persons, or part thereof up to 1,000 persons; or
(iv) 1 m for each additional 100 persons over an occupancy load of 1,000 persons.

(b) in any one ramp, corridor, passageway, or doorway a minimum width as follows:

Notes:

1. The width of ramps, corridors, passageways and doors may need to be increased to allow furniture or equipment to be moved.

2. Where two or more occupancies have common exitways, the more restrictive requirements for doors shall apply.

9.5.3 Projections and obstructions in exitways

Exitways shall not reduce in width in the direction of egress travel except for:

(a) stair handrails and stringers, which shall project 40 mm;

(b) doors opening onto a stairway or ramp landing, which may project provided they do not reduce the clear width 500 mm; and

(c) door handles and other hardware, which may project when the door is open,100 mm.

9.5.4 Landings

A landing, with length equal to the width of the stairway or ramp, shall be provided at all changes in direction and at all doorways opening to a stairway or ramp, and:

(a) in a stairway, at each 3.5 m of vertical rise; and

(b) in a ramp, at top and bottom and each 1.5 m of vertical rise.

9.5.5 Moving walkways, ramps and escalators

(a) A moving walkway or ramp shall be used in a required exitway provided:

(i) it is constructed of materials that are non-combustible or would otherwise not facilitate fire spread through the building;

(ii) if required to be fire-isolated, it is enclosed in a shaft or passageway with the fire-resistance rating, and access and egress doors complying with the relevant provisions of this Code;

(iii) its operation is such that upon activation of a fire or smoke alarm in the building, it automatically stops, and it is capable of being manually switched to operate only in the direction of egress; and

(iv) in the event of a power failure, the walkway or ramp shall be used as a normal exitway which complies with the requirements of this Code.

(b) an escalator shall not be counted as a required exitway but upon activation of a fire or smoke alarm in the building, it shall automatically stop and be capable of being manually switched to operate only in the direction of egress.

9.6 Fire-isolated exitways

9.6.1 Where fire-isolation is required

Except in an open-deck car park, a stairway shall be external to the building and constructed, or enclosed in a fire-isolated shaft if it connects:

(a) more than 3 storeys in a building of Occupancy Classification R-2- Apartments; and

(b) in other occupancy classifications, more than:

(i) 2 storeys if the building is not sprinklered; and

(ii) 3 storeys if sprinklers are installed throughout.

9.6.2 Open external stairways

Except in Occupancy Group I - Institutional, open external stairways shall be used instead of fire-isolated stairways in buildings 6 storeys in height, provided:

(a) any window or unprotected part of the external stairway is not closer than 3 m to an allotment boundary or any unprotected window or other opening in the external wall of the building;

(b) doorway openings from occupancies or access corridors at each storey level:

(i) are protected with a 1 h fire door; or

(ii) open to an external balcony which is at least 1.5 m in width and the external wall of the building, ceiling and floor of the balcony are of non-combustible construction.

9.6.3 External fire escapes

External fire escapes not complying shall only be used as an element of a required exitway. In relation to the upgrading or retrofit of an existing building when more adequate egress facilities cannot be provided. Where approved such fire escapes shall:

(a) not be used to provide more than 50% of the required exit capacity from any area within the building;

(b) have the lowest landing of 1 m wide and 1 m long, positioned 2.4 m and 3.6 m above ground, road or pathway level, and equipped with a counter-balanced stairway to the ground, road or pathway;

(c) be designed to support a live load of 0.5 MPa, constructed of steel or other non-combustible material, or suitably fire-resistant treated timber;

(d) be constructed with walkways and stairs:

(i) 560 mm wide;

(ii) treads, 200 mm and risers 200 mm; and

(iii) handrails, 760 mm or more than 900 mm high.

(e) have any doors, windows, vents, exhausts, grills or other openings along the line of the fire escape protected with 1 h fire doors, shutters or screens with 1 h fire-rating.

9.6.4 Horizontal exits

Egress doorways through a fire wall allowing escape from a room or space within a building to a refuge in an adjacent fire-compartment at the same level, shall be counted as an exit provided:

(a) not more than 50% of the exitways from the room or space are horizontal exits;

(b) the area on the side giving refuge, or both sides if the horizontal exit is 2-way, has sufficient floor area to accommodate in addition to its normal occupancy load, persons seeking refuge calculated at the rate of:

(i) 0.3 m^2 per person;

(ii) 1.5 m^2 per wheelchair occupancy; and

(iii) 3 m^2 per bedridden person.

(c) egress from the area giving refuge shall be within the travel distances specified in **9.4** to:

(i) exit doors direct to the outside; or

(ii) an interior fire-isolated stairway.

(d) doors swing in the direction of egress, or if the horizontal exit is counted as an exit from both sides, doors swing from the area on that side of the horizontal exit with the highest occupancy load.

9.6.5 Communication stairways

In any building where the exitways are required to be fire-isolated, other than Occupancy Group A -Assembly or H -Hazardous, a non-fire-isolated stairway shall connect not more than 2 storeys provided:

(a) the stairway is not counted as a means of egress;

(b) the size of the fire compartment formed by all connected areas does not exceed the limits specified in **7.2**; and

(c) the exit capacity of the required means of egress from each of the connected storeys is sufficient for the occupancy load of both storeys.

9.6.6 Smoke-proof stairway lobbies

Interior fire-isolated stairways in buildings of more than 6 storeys shall be protected from smoke entry by either:-

(a) a smoke-proof lobby or vestibule separating the occupancy area from the stair shaft, with:

(i) a floor area of 6 m^2;

(ii) walls having a non-combustible lining on the occupancy side extending from floor slab to the underside of the slab above or to a 1 h fire rated ceiling;

(iii) all doorways or other re-openings into occupancy areas protected with self-closing or automatic smoke-proof doors constructed of solid-core timber with 34 mm thickness or safety flags set in a metal frame, with rebates 12 mm and smoke seals at the sides and top, and at the bottom if there is more than a 10 mm gap under the door; and

(iv) return exhaust from air-conditioned spaces not passing through the lobby.

(b) a mechanical ventilation system which is connected to the emergency power supply, and:

(i) operates independently from any other air-conditioning or ventilation systems in the building;

(ii) supplies air to the stairway enclosure at the lowest level of discharge, and at the bottom of the shaft if it serves a basement, and exhausts at the top;

(iii) automatically operates when any smoke detector in the building is activated; and

(iv) achieves a positive pressure differential of 50 Pa across each entry door when all doors are closed.

9.6.7 Smoke-proof stairway and lift shafts

Exhaust or return air ducts shall not discharge into stairway or lift shafts. (**See Clause 8**).

9.7 Discharge of exits

9.7.1 Ground floor lobbies and passageways

An exitway shall discharge into an interior lobby or vestibule used for access and egress only, or a passageway, provided:

(a) not more than 50% of all stairways in the building discharge through the same lobby or passageway;

(b) the size of the lobby or passageway and width of exits therefrom, have the capacity to serve the combined occupancy load of the exitway and all ground floor occupancies opening to the lobby; and

(c) the enclosing walls of the lobby or passageway have a 1 h fire-resistance rating and any doorways or openings to ground floor occupancies are protected with 1 h fire doors and/ or 1 h fire windows.

9.7.2 Discharge identification

A sign shall be provided at each landing in all enclosed stairways designating the floor level above the floor of discharge. Partitions, doors or other effective means shall be provided as necessary to revenge persons continuing past the floor of discharge while egressing.

9.7.3 Discharge to open space

Exitways from a storey or space within a building:

(a) shall provide safe and continuous means of egress to a street or an open yard, court or other space of sufficient size to provide safe and direct access to a street free of obstruction and not impaired by fire, smoke or other cause; and

(b) may proceed over another building or structure, such as a roof garden, podium or deck, provided the floor construction is concrete and has a fire-resistance rating of at least 2 hours and both buildings are otherwise adequately separated with fire-resisting construction.

9.7.4 Alternative exitways

Where more than one exitway is required from a storey or space, or discharges from a building, they shall be place as remote from each other as practicable, and arranged to provide direct access in separate directions from any point in the area served.

9.8 Ramp and stair dimensions

9.8.1 Stair treads and risers

(a) The dimensions of stair risers and treads shall be as follows:

(i) the space between treads in an open stair, that is, the rise, shall not exceed 150 mm; and

(ii) treads shall not be of mesh or other perforated material if the stairway is more than 10 m high or connects more than 3 storeys.

(b) In curved or circular stairways, the tread going shall measure:

(i) 270 mm from the outside if the flight is not more than 1 m wide; and

(ii) 270 mm from each side if the flight is more than 1 m wide.

(c) Winders shall not be used in a required exitway except where the stairway is within an individual dwelling unit in a building of Occupancy Group R, in which case winders shall have a tread going of 230 mm measured at a point _ of the width of the stairway in from the narrow end of the winder.

9.8.2 Stairways serving small areas

Circular or spiral stairways shall be used as exitways from mezzanine floors or other small areas in buildings which do not exceed 25 m^2 and have an occupancy load not more than 10 persons, or in buildings of Occupancy Classification R-3 Houses if:

(a) the width of the stair is 700 mm;

(b) the tread going is 200 mm at a point 300 mm in from the narrow end.

9.8.3 Ramps

(a) The slope of ramps in a building shall be:

(i) **For pedestrians:** 1:12 where required for access or egress by disabled persons under **5.1.6** or 1:8 otherwise; and

(ii) **For vehicles:** 1:6 where not used for pedestrian access or egress.

9.9 Corridors and passageways

9.9.1 Access doors to tenancies

In other than Occupancy Classification R-3 -Houses:

(a) where more than one doorway is required to open from a room or space within a building leading to an exitway access passageway, corridor or aisle, the doorways shall be located as far as practicable from each other; and

(b) a room or tenancy with an occupancy load of more than 50 persons or which exceeds 200 m^2 in area, shall have at least 2 egress doorways leading from the room or tenancy to an exitway or access passageway or corridor.

9.9.2 Access passageways

Direct access to stairways or ramps shall be provided from occupancies through continuous passageways or corridors, which:

(a) comply with the dead-end travel limits in **9.4.2**, and are conveniently accessible by all occupants and maintained free from obstruction; and

(b) are separated from occupancies with 1 h fire-rated construction and any doorways opening to the corridor protected:

(i) in Occupancy Classifications R-1- Hotels, R-2- Apartments, or I-1- Institutional (Restrained), with doors as specified; or

(ii) in other Occupancy Classifications, if they serve as a required exitway for more than 30 persons, with 30 minutes self-closing or automatic fire doors or solid-core doors with 35 mm thickness.

9.10 Balustrades and handrails

9.10.1 Stair guards and balustrades

Where there is the danger of persons falling, or where small children might climb over the side, an open stairway, ramp, landing, balcony, bridge, trafficable roof, or similar structure, with a change of more than 1 m, shall have a guard wall or balustrade which:

(a) if the change in level exceeds 3 m (including stairways that do not have an open well or side): Has a height of 865 mm and no openings in the wall or balustrade more than 300 mm across;

(b) if the change in level exceeds 3 m: Has a height of 1 m, no openings in the wall or balustrade wider than 150 mm and no horizontal rails or ledges that could provide a toe-hold; or

(c) a railing or barrier in front of fixed seating in the balcony of an assembly building: Has a height of 700 mm with a horizontal projection extending 1 m outwards from the top of the railing.

9.10.2 Handrails

Handrails shall be provided as follows:

(a) **Stairways:** At a height of 865 mm above the line of the treads and the floor of the landings:

(i) on at least one side of each ramp and stairway;

(ii) on both sides of a stairway or ramp more than 1 m in width; and

(iii) intermediate handrails where the width of the stairway exceeds 2.2 m, dividing the stairway into 2 or more lanes each 2 m wide.

(b) **Ramps:** On at least one side where the ramp has a slope greater than 1:15, located between 760 mm and 900 mm from the ramp surface.

(c) Handrails shall be continuous, smooth and extend 300 mm beyond the up and bottom of the stairway or ramp and return to wall or posts at the ends.

Note: handrails may be placed over, attached to, or form a part of any balustrade or stair guard or dark or protective wall at the edge of a ramp or landing.

9.10.3 Structural design of handrails and balustrades

Handrails and stair guards or balustrades shall be designed to withstand an applied load of 100 kg in any direction at any point.

9.11 Doors

9.11.1 Swinging doors

In an exitway:

(a) doors shall swing in the direction of egress travel;

(b) hinged doors in series shall not be included unless:

(i) the space between them is at least 900 mm in single dwellings or 2 m in other buildings, measured with the doors in the closed position; or

(ii) they are power-operated and arranged to open together in an emergency.

9.11.2 Double doors

In double opening doors, at least one leaf shall comply with the minimum width and unless both doors are self-closing or automatic, and leaf in a double door which is less than the minimum width shall be discounted for exit purposes.

9.11.3 Revolving doors, roller shutters and sliding doors

A doorway in an exitway shall not be fitted with:

(a) a revolving door unless it opens directly to the outside and it is either:

(i) not counted as part of the required exit width; or

(ii) adjacent to hinged outward opening door(s) which make up at least the required exit width.

(b) a roller shutter or tilt-up door unless:

(i) it serves a private garage; or

(ii) the floor area it serves is less than 200 m^2 and the door is held in the open position whenever the area is occupied.

(c) a sliding door unless:

(i) it serves a single dwelling unit, a private garage, or other area 200 m^2 in floor area;

(ii) it is power-operated and automatic; or

(iii) it is held in the open position whenever the area it serves is occupied.

9.12 Door hardware

9.12.1 Operation of latch

Whenever a building or part of a building is legally occupied, all required egress doors shall be readily operable from the side that faces a person seeking egress without the use of a key or special knowledge or effort, except:

(a) as permitted in **9.12.2**;

(b) institutional uses as specified in **9.12.3**;

(c) residential units as specified in **9.12.4**; and

(d) secure business establishments specified.

9.12.2 Locking devices

Draw bolts, hooks, flush bolts, double cylinder dead locks requiring a key operation on both sides, and similar devices, shall not be used on an egress door unless the door is normally left unlocked and a visible and durable notice is attached to the door stating: "**THIS DOOR TO REMAIN UNLOCKED DURING OCCUPANCY**" in letters of 25 mm high and a colour contrasting with the background.

9.12.3 Institutional uses

Egress doors in Occupancy Classification I-1 -Institutional (Restrained) shall have specially designed locking arrangements and security systems controlling means of egress, provided they incorporate suitable releasing devices in the event of emergency.

9.12.4 Residential units

Egress doors to buildings of:

(a) Occupancy Classification R-1 -Hotels and R-2 -Apartments which are let for commercial purposes, shall have door chains attached to unit egress doors; and

(b) Occupancy Classification R-3 -Houses shall have door chains attached to external doors and draw bolts, hooks, flush bolts, double cylinder dead locks, or similar locking devices.

Note: Care should be taken in the arrangement of locking systems for dwellings to ensure that adequate means of escape is maintained in the event of a fire or other emergency, in particular for young children.

9.12.5 Secure business establishments

Where the nature of the business conducted so warrants, or where there is the need for a high level of physical security, such as in the vault areas of banks, secure government offices, communications, defence or police establishments, and the like, approval shall be given for access and egress doors to be unlocked by:

(a) security guards on constant duty at the door;

(b) security key or card key used by the occupants seeking access and egress doors; or

(c) other specially designed locking arrangements and security systems controlling means of egress provided the building or area is not open to the general public and the locking or security system incorporate-suitable back-up-arrangements to ensure that all occupants are able to escape to a place of safety in the event of emergency.

Notes:

1. Special measures should be taken to prevent unlawful entry of business and residential premises.

2. Consideration should be given to locking arrangements for doors and windows, security chains, peepholes in doors, movement detectors and intruder alarms, and supervised or monitored alarm systems.

3. External cladding should be sufficient to inhibit break and entry, and remote or dark external spaces where potential intruders could hide, should be avoided.

4. Advice on security arrangements is available from the Crime Prevention Department.

9.12.6 Panic bolts for assembly buildings

In a building of Occupancy Classification A- Assembly, except a church, mosque or temple with an occupancy load more than 50 persons, all doors with latching devices shall have suitable panic hardware which:

(a) causes the door latch to release under a force of 70 N applied in the direction of egress; and

(b) consists of a bar or panel extending half the width of the door and at a height between 750 mm and 1.1 m above the floor.

9.12.7 Stairway re-entry and access by fire service personnel

In enclosed stairways:

(a) locking arrangements shall allow re-entry without a key from the stairway at least at each alternate storey; and

(b) a sign on the stairway side of the exit doors at each level that is locked, shall indicate that entry is not permitted.

9.12.8 Mechanical operation of doors

Egress doors that are arranged to open by mechanical devices:

(a) if not power-operated, shall be designed so that the door shall be opened manually and will release under a pressure of 70N applied in the direction of egress travel; and

(b) if power-operated, shall be capable of being opened under a pressure of 225 N applied at the normal door knob location when the power is lost.

9.13 Floor finishes and obstructions

9.13.1 Floor, tread and ramp finishes

The floor surface in all interior and external exitways shall:

(a) be such as not to constitute a hazard to users through excessive roughness or slipperiness, especially when wet or exposed to water; and

(b) on ramps exceeding a slope of 1:12, or wherever the use is such as to involve a danger of slipping, be surfaced with suitable non-slip materials.

9.13.2 Openings and protrusions

In any exitway:

(a) manholes or floor access panels shall not be located in the path of egress; and

(b) low-hanging door closer, signs, ceiling lights, or other fixtures, shall not protrude into corridors of stairways so as to reduce the ceiling height below 2m or otherwise obstruct occupants seeking egress.

9.14 Exit signs and emergency lighting

9.14.1 Emergency lighting

Emergency lighting to assist egress shall be provided in:

(a) all fire-isolated exitways, smoke-proof lobbies and all exitways from any storey required to have emergency lighting;

(b) all basement storeys and all windowless storeys regardless of Occupancy Group; and

(c) occupancy areas as follows:

Notes: 1. For further information on emergency lighting systems, refer to the latest edition of AS 2293 and BS 5266.

2. Concessions for theatres, public halls, churches and schools are given 9.14.3.

9.14.2 Level of illumination

Emergency lighting shall:

(a) be supplied from batteries or other independent emergency power source, and ensure continued illumination in case of emergency or loss of primary power for a duration of 1 h;

(b) be located within occupancies and exitways as necessary to light egress paths, and exit signs if they are not internally illuminated; and

(c) achieve an intensity on the centre line of exitway routes of 0.2 lux, and this level of lighting shall be provided immediately or at most within 5 seconds of failure of the normal lighting.

9.14.3 Theaters, churches and schools

Emergency lighting:

(a) in places of assembly such as theatres for motion picture projection or performing arts, where 0.2 lux illumination of emergency lighting is likely to affect such activities, shall be reduced to a maintained level of 0.02 lux, provided that in the event of failure of the normal lighting, the level of emergency lighting is immediately and automatically restored to a minimum of 0.2 lux; and

(b) in churches, public halls and schools, shall be omitted if the public or occupancy area of each room or space is 50 m^2 opens directly to the outside.

9.14.4 Buildings required to have exit signs

All required means of egress shall be indicated with internally illuminated exit signs, and at each change in direction in corridors and passageways, a directional sign indicating the direction and way of egress, in:

(a) all buildings required to have emergency lighting under **Table 19**, in which case the exit signs shall be either internally illuminated or externally illuminated by an emergency light fixture; and

(b) all buildings with an occupancy load of more than 50 persons.

Table 11

Requirements for emergency lighting

Occupancy group	**Areas required to have emergency lighting**
A - Assembly	All interior public areas and exitways.
B - Business	In every storey with floor area more than 300 m^2 and any storey above ground floor.
F - Factory	In every storey with floor area more than 300 m^2 and any storey above ground floor.
H - Hazardous	In every storey with floor area more than 300 m^2 and any storey above ground floor.
I - Institutional	In every storey with floor area more than 300 m^2 and any storey above ground floor.
M - Mercantile	In every storey with floor area more than 300 m^2 and any storey above ground floor.
R - Residential R-1- Hotels R-2 -Apartments R-3 -Houses	Interior exitways of buildings with more than 12 bedrooms. Interior exitways of buildings with more than 12 dwelling units. No requirement.
S - Storage	In every storey with floor area more than 1,000 m^2.

9.14.5 Location of exit signs

Exit signs shall be located:

(a) adjacent to fire-isolated stairway and external stairway access doorways;

(b) except in buildings of Occupancy Group R-Residential, adjacent to doorways opening from assembly rooms and tenancies or occupancies to public corridors or smoke-proof lobbies; and

(c) adjacent to exit doors opening from occupancies or exitways to the outside.

9.14.6 Design of exit signs

Exit signs shall be clearly visible by any occupant seeking egress, shall be reworded with green lettering 150 mm high and 20 mm thickness on a white background, on materials such that the letters are clearly discernable without internal illumination or when it is not energised.

9.15 Maintenance of means of egress

9.15.1 Obstructions of exitways

Exit doors, stairways, passageways and all other parts of exitways in a building shall:

(a) not be obstructed with materials, stored goods, equipment, or the like, or altered such that the required clear widths are reduced; and

(b) if external, be kept in repair to withstand exposure to the weather and to ensure that treads, landings and walkways do not become smooth and slippery when wet.

9.15.2 Exit signs and emergency lighting

Exit signs and emergency lighting systems shall be regularly inspected and maintained to ensure that they remain capable of proper operation in an emergency.

10 Fire protection and emergency systems

10.1 Application of this Sub-section

This sub-clause specifies requirements for the installation and maintenance of fire suppression, warning systems and smoke control systems in buildings.

10.2 Material, equipment and threads

All materials and equipment used in a fire protection system shall be consistent with the requirements of this Code. Couplings provided for by the Guyana Fire Service Department.

Connections to sprinkler systems, stand-pipes, yard hydrants or any other fire hose connections shall be compatible with those used by the Guyana Fire Service Department.

10.3 Water supply

All fire suppression and standpipe systems shall be provided with permanent supply of water of adequate pressure, capacity and reliability to perform the function intended.

10.4 Acceptance testing

Before acceptance and issue of an Occupancy Certificate, fire protection and emergency equipment shall be inspected and tested in the presence of an officer from the Guyana Fire Service Department to confirm that it is operating in compliance with this Code.

10.5 Sprinkler systems

10.5.1 Plans and specifications

The plans and specifications submitted for approval shall contain sufficient detail to evaluate the hazard and effectiveness of the fire suppression system proposed.

10.5.2 Types of fire sprinkler systems

There are four main types of automatic fire sprinkler systems:

(a) water sprinklers (or flood spraying);

(b) foam extinguishing systems;

(c) carbon dioxide or halogenated (suppressive gases); and

(d) dry chemical extinguishing systems.

Note: See 8.2 for selection of the type of system most suitable for the building and/or occupancy involved.

10.5.3 Where required

Automatic fire sprinkler systems shall be installed and maintained in full operating condition, as follows:

Note: 1. See 7.7.12 for further requirements for sprinklers in theatres and public halls.

2. See 8.2 for concessions for telephone exchanges, switch rooms.

3. Sprinkler systems in I-1- Institutional (restrained) occupancies may be automatic or manually operated by security staff.

10.5.4 Alternate protection

In special use occupancies, an automatic fire alarm system shall be installed instead of a fire sprinkler system when sprinklers would be detrimental or dangerous to the specific use of the occupancy.

10.5.5 Concessions for hospitals and nursing homes

In hospitals and nursing homes, an automatic sprinkler system specified in **Table 12** need not be provided:

(a) to patient rooms where each room has direct egress to the outside at grade or ground level;

(b) in buildings of Type 1 construction, in operating rooms, X-Ray room, delivery rooms, intensive car rooms and patients' sleeping rooms 60 m^2 in area, when each room is protected by an automatic fire alarm system connected to a central enunciator; and

(c) in a one storey day nursery for 100 children with each room having an exit directly to the outside.

10.5.6 Range hoods

In all range hoods in hotels, hospitals, and other institutions where the risk of fire is high:

(a) a carbon dioxide (CO_2) halogenated gas, or a dry chemical fire suppression system (not water) shall be installed; and

(b) where natural or LP gas is used as a fuel, a manual reset safety valve shall be installed on the gas service line to prevent fuel from flowing into the burner(s) in event of activation of the extinguishing system.

10.5.7 Telephone exchanges and switch rooms

In central telephone switch rooms and telephone exchanges, automatic fire sprinklers shall be omitted in generator and transformer rooms and communication equipment areas, if such rooms or areas are used exclusively for such equipment and are:

(a) protected with an automatic fire alarm system; and

(b) separated from the remainder of the building by a 1 h fire rated wall and 2 h fire rated floor-ceiling assembly.

10.5.8 Classification of fire hazards

As a guide to the proper type of fixed fire protection system and the extinguishing agent for wood, each type of hazard, and fire shall be classified as follows:

(a) **CLASS A:** Fires involving organic solids producing glowing embers and ordinary combustible materials (such as wind, cloth, paper, rubber and many plastics), requiring the heat-absorbing or cooling effects of water, water solutions or the coating effects of dry chemicals which reared combustion;

(b) **CLASS B:** Fires involving flammable or combustible liquids, flammable gases, greases and similar materials where extinguishment is most readily secured by excluding air and oxygen, inhibiting the release of combustible vapours or interrupting the combustion chain reaction.

(c) **CLASS C:** Fires involving energized electrical equipment where safety to the operator requires the use of electricity non-conductive extinguishing agents; or

(d) **CLASS D:** Metals (for example, Aluminum or magnesium).

Note: Electrical fires should not be fought with portable Class A or B extinguishers or with hand-held solid stream nozzle(s). However, fixed water spray systems may be used to fight fires in energized electrical systems.

10.5.9 Special hazards

In rooms of buildings containing combustibles, such as aluminum powder, calcium carbide, calcium phosphide, metallic sodium or potassium, quicklime, magnesium powder, or sodium peroxide which are incompatible with the use of water as an extinguishing agent, other extinguishing agents shall be used.

Table 12

Requirements for automatic sprinkler systems

Occupancy Classification and compartment or room	When automatic sprinklers are required
A - ASSEMBLY A-1 Theater Auditorium Stage, backstage area	When required by **7.2** and if more than 200 m^2 in area unless the theater has a proscenium wall separating the stage from the auditorium.
A-2 Nightclub	When required by **7.2**
A-3 Public hall	As for A-1 Theaters
A-4 School church	When required by **7.2**
A-5 Stadium	When required by **7.2**
B - BUSINESS	When required by **7.2**
F - FACTORY	When required by
H - HAZARDOUS Storage of flammable film Paint spraying Dry-cleaning	When required by Sub-Section **7.2**, and if required by Fire Service under **7.6.1** or **7.6.2**. If required by **7.6.6**. If required by **7.7.1**
I - INSTITUTIONAL I-1 Prisons I-2 Hospitals	 When required by **7.2** When required by **7.2**, except Where permitted otherwise in **8.2**
M - MERCANTILE	When required by **3.1** and if more than 3 storeys in height.
R - RESIDENTIAL R-1 Hotels R-2 Apartments R-3 Houses	 When required by **7.2** No requirement.
S - STORAGE (Including public garages)	When required by **7.2**.

11 Selection of fire suppression system

Where a fire suppression system is required, (**See Table 13**) the type of system shall be suitable for the hazard involved, if not specified in this Code, shall be as follows:

Table 13
Guide for selection of fire suppression system

Hazard	Water sprinklers or spray	Foam	Carbon dioxide or halogenated	Dry chemical
Class A fire potential	x	x	x	x
Class B fire potential	x	x	x	x
Class C fire potential	x		x	
Special Fire Hazard Areas				
Aircraft hangers	x	x	x	x
Alcohol storage	x	x	x	x
Ammunition loading	x			
Ammunition magazines	x			
Asphalt impregnating	x	x		
Battery rooms			x	
Carburator overhaul shops	x	x	x	x
Cleaning plant equipment	x	x	x	x
Computer rooms	x		x	
Drying ovens	x	x	x	x
Engine test cells	x		x	
Escalator, stairwells	x			
Explosives:				
Manufacturing storage	x			
Flammable liquid storage		x	x	
Flammable solids storage	x			
Fuel Oil storage	x	x		
Hanger floors	x	x		
Hydraulic oil	x		x	
Lubrication oil				
Hydro-turbine generators	x		x	

Jet engine test cells	x	x	x	
Library stacks	x		x	
ignite storage or handling	x			
LP gas storage	x			
Oil quenching bath	x	x	x	x
Paints manufacturing or storage	x	x	x	x
Paint spray booths	x		x	x
Petrochemical storage	x	x	x	
Petroleum testing Laboratories	x		x	
Printing presses	x	x	x	
Range hoods	x		x	x
Record vaults	x		x	
Rubber mixing and heat treating	x			
Service station (Inside buildings)	x		x	
Shipboard storage	x		x	
Solvent cleaning tanks		x	x	x
Solvent thinned coatings				
Switchgear rooms				
Transformers, circuit		x	x	x
Breakers (outdoors)	x		x	
Transformers, circuit Breakers (indoors)	x		x	
Turbine lubricating oil	x	x	x	x
Vegetable oil, solvent extraction	x	x		

11.1 Water sprinkler systems

11.2 Occupancy sprinkler systems

In a building of mixed occupancies where an occupancy is required by this Code to be sprinklered with more than 20 sprinklers, the area shall be enclosed with walls, floors and ceilings with 2 h fire rating.

11.1.2 Actuation

Sprinkler extinguishing systems shall be automatically actuated by spray heads, actuated by heat or smoke.

11.1.3 Sprinkler alarms

Audible or visual alarm devices shall:

(a) be located in a suitable external location and, except in the case of a limited area, the sprinkler system shall be connected to every water sprinkler system; and

(b) have at least one additional audible or visual alarm device installed within the building.

11.1.4 Combination sprinkler/standpipe water supply

Where both sprinklers and standpipes are installed, they shall have a common water service as their combined source of supply. The connection shall not be made to a water main of 100 mm in diameter. In sprinklered buildings with combined standpipes, the water supply shall be adequate for the sprinkler system or the standpipe system, which is the greater.

11.1.5 Combination sprinkler/domestic water supply

A sprinkler system shall be connected to the domestic water supply system, provided that the supply system is of adequate pressure, capacity and size for the simultaneous operation of the water sprinkler system and domestic needs. A check valve shall be installed in the water sprinkler supply line to prevent contamination of domestic water.

11.1.6 Tests

A completed system shall be tested hydrostatically for 2 h without visible leakage at 1.4 MPA or at 0.35 MPa in excess of the maximum static pressure when such maximum static pressure is in excess of 100 MPa.

11.2 Limited area sprinkler systems

11.2.1 Installation

Where the provisions of this Code require only a limited number of sprinklers, a limited area sprinkler system shall be installed, which:

(a) shall be used only in rooms or areas enclosed with walls of fireproof construction and with a 2 h fire rating; and

(b) shall be activated automatically in accordance with **8.3.2**, but need not have audible or visual alarm devices.

11.2.2 Water supply

Limited area sprinklers shall be supplied from the domestic water system provided:

(a) the system is designed to adequately support the design flow of the largest number of sprinklers in any one of the enclosed areas;

(b) the number of sprinklers in any one enclosed room or area does not exceed 20 sprinkler heads which shall totally protect the room or area; and

(c) the minimum capacity of water shall be 22,500 L.

11.2.3 Cross-connection

A limited area sprinkler system shall be supplied individually from the domestic water system or from the standpipe system. There shall be no cross-connection between the domestic and the standpipe system.

11.2.4 Fire service connections

A Fire Service connection is not required for limited area systems supplied from the domestic water system.

11.3 Water spray fixed systems

11.3.1 General

Water spray or flood spray extinguishing systems shall be of an approved type and installed in accordance with the provisions of this Code.

Note: Water spray fire systems are also known as "Flood Spray Systems" and as opposed to sprinkler systems produce much more cooling, damping and flooding effects by the virtue of heavier pipework and "spray" heads needed to produce this greater volume of water.

11.3.2 Actuation

Water spray extinguishing systems shall be of the automatically actuated types with supplementary manual tripping capability.

11.3.3 Tests

All new piping systems shall be hydrostatically tested in accordance with **8.3.4.1**.

11.4 Foam extinguishing systems

11.4.1 General

Foam extinguishing systems shall be of an approved type and installed in accordance with the provisions of this Code.

11.4.2 Plans and specifications

The detail supplied with the plans and specifications shall include computations showing pressure drop in all piping system, friction loss calculations on liquid lines, and a layout of the entire hazard to be protected.

11.4.3 Actuation

A foam extinguishing system shall be automatically actuated but with supplemtary manual tripping capability.

11.4.4 Tests

(a) All piping except that which handles expanded foam, shall be subjected to a 2 h hydrostatic pressure test at 1.4 MPa or 1.0 MPa in excess of the maximum pressure anticipated, whichever is the greater, without leakage.

(b) The system shall also be subjected to a flow test:

(i) to show that the hazard is fully protected in conformance with the design; and

(ii) to determine flow pressures, actual discharge capacity, foam quality, consumption rate of foam-producing materials, manpower requirements and other operating characteristics.

11.5 Carbon dioxide extinguishing systems

11.5.1 Plans and specifications

The detail supplied with the plans and specifications shall include information on the amount of carbon dioxide, the location and flow rate of each nozzle, including orifice area, and the size of , and location of, the CO_2 storage facility. Information shall also be submitted about the location and function of the detection devices, operating devices auxiliary equipment, electrical circuits if used, and any or all special features of the system.

11.5.2 Actuation

Carbon dioxide extinguishing systems shall be automatically actuated with supplementary manual tripping capability.

11.5.3 Safety requirements

In any proposed use of CO_2 where there is any possibility that persons may be trapped in, or enter into atmospheres made hazardous by gas discharge, warning signs, discharge alarms, and breathing apparatus shall be provided to ensure prompt evacuation of ,or to prevent entry to, such atmospheres, or to provide rescue of any trapped persons.

11.5.4 Tests

A completed system shall be tested for tightness up to the selector valve and for continunity of piping with labelling of devices with proper designations and instructions checked.

Operational tests shall be conducted on all parts of the system (except cylinder valves in multi-cylinder high pressure systems).

11.4.5 Range hoods

In addition to the above requirements, range hood CO_2 systems shall conform to the following:

(a) where more than one hood in the same general area is to be served, each hood shall have a separate manual station actuator and a separate CO_2 supply;

(b) upon activation of the CO_2 system, the fan(s) shall cease to operate and the supply valve shall shut off the pilot and burner(s);

(c) duct systems from range hoods shall not be equipped with fire dampers unless specifically approved for such use, or are required as part of an approved extinguishing system or a fan bypass system;

(d) CO_2 bottles shall be located 5 m from the range or range hood. The temperature in the storage area shall not exceed 50°C or be less than 0°C; and

(e) an electric warning light of 10 watts shall be provided on the CO_2 bottle or system which will automatically light up when the bottle or system is depleted. This light shall be of a distinctive (preferably red) colour and shall be located in a conspicuous location.

11.6 Halogenated (gas) fire extinguishing systems

11.6.1 General

All requirements given above in 8.7 apply to this type of fire protection system.

Notes: 1. Halogens produce exactly the same effect in smoking fires (keeping oxygen out) as does carbon dioxide.

2. Halogenated gases are used in lieu of carbon dioxide:

(a) because in some areas they are more available or less expensive to produce; or

(b) in the rare event that CO_2 would have some adverse chemical effect on the stored material and where a fire is likely to occur.

11.7 Dry chemical extinguishing systems

11.7.1 General

Dry chemical extinguishing systems shall be of an approved type, and installed in accordance with the provisions of this Code.

11.7.2 Plans and specifications

The details supplied with the plans and specifications shall include sufficient information and calculations on the amount of dry chemical; the size, length and arrangement of connected piping or hose; and description and location of nozzles so that the adequacy of the system can be determined.

Sufficient detail shall be submitted to properly identify the apparatus and devices used, and any special features of the installation.

11.7.3 Actuation

A dry chemical extinguishing system shall be automatically actuated with supplementary manual tripping capability.

11.7.4 Safety requirements

Where there is any possibility that personnel may be exposed to a dry chemical discharge, warning signs, discharge alarms and breathing apparatus shall be provided to ensure prompt evacuation of such locations and also to provide means for rescue of any trapped personnel.

11.7.5 Tests

A completed system shall be tested by a discharge of expellant gas through the piping and nozzles to check for serious gas leakage and or continuity of piping with free unobstructed flow of expellant gas through all nozzles. The labelling of devices with proper designations and instructions shall be checked. After testing, all piping and nozzles shall be blown clean, using compressed air or nitrogen and the system properly charged and placed in the normal "set" condition.

11.7.6 Range hoods

In addition to the above requirements, range hood dry chemical systems shall conform to the following:

(a) dry chemical systems shall bear the label of a nationally recognized testing and inspection agency and shall be installed in accordance with their recommendations. The size of the hood(s) and duct(s) covered by a single system shall not exceed the agency's recommendations;

(b) the dry chemical agent used shall be non-toxic;

(c) multiple hoods shall be protected by a common system if in conformance with a report of the testing agency;

(d) each duct system shall constitute an individual system serving only exhaust heads on one floor;

(e) dry chemical bottles shall be located 5 m from the range or range hood, or as approved by the Guyana Fire Service Department; and

(f) an approved fire extinguisher shall be provided and located 5 m and 3 m from the hazard.

11.7.7 Stand-pipes, hydrants and hose reels

Where required, stand-pipes shall be installed and maintained in full operating conditions in accordance with this Code as follows:

(a) **Size of stand-pipes**

Stand-pipes or rising mains shall extend from the lowest portion of the building to a height of 1 m above the finished floor of the topmost storey and shall have a minimum diameter as follows:

Notes: 1. In sprinklered buildings, the standpipe diameter may be based on available hydraulic

2. A 150 mm standpipe is satisfactory up to 100 m; should a standpipe be required at any greater height, hydraulic calculations are required.

(b) **Number of risers**

The number of standpipe risers shall be such that all parts of every floor can be reached by a 10 m hose stream from a nozzle attached to 30 m of hose connected to a riser outlet. In those buildings equipped with an interior enclosed smoke-proof vestibule, at least one standpipe hose connection shall be located in that vestibule.

(c) **Combination standpipe and sprinkler risers**

Standpipe system risers shall also serve as the water sprinkler system risers in building having both systems. A control valve shall be installed in each sprinkler system or standpipe to allow the system to remain operational.

(d) **Hose connections**

At each floor level and 1.5 m above the floor, there shall be connected to each standpipe one 65 mm hose connection and a 20 mm hose connection.

(e) **Hose reels**

Each 20 mm hose connection shall be equipped with 30 m of fire hose with a variable fog nozzle and couplings, and hung in a turning rack and/or cabinet with reel. The hose provided for rack and/or cabinet use shall be of rubber or other suitable material and designed to be pulled out to its full length for use with the minimum effort.

Exception: In fully sprinkled buildings the smaller hose connection and hose-reel with or without cabinet is not required.

(f) **Roof hydrant**

Where stand-pipes extend through the roof of a building, an approved hydrant or manifold shall be provided. The main control valve on a roof hydrant or manifold shall be located in an area as close to the roof access as practical, and plainly marked.

(g) **Material**

All stand-pipes shall be of galvanized wrought iron or other pipe fitting and valves shall be of extra heavy patter construction when the working pressure will exceed 0.5MPa.

(h) **Capacity**

Stand-pipes shall be sized for a minimum flow of 2,250 liters per minute for the first standpipe, plus 1,125 liters per minute for each additional standpipe, the total shall not exceed 11,250 liters per minute. The supply shall be sufficient to maintain a residual pressure of 0.45MPa at the topmost outlet of each standpipe with 1,125 liters per minute flowing.

(i) **Yard hydrants**

Fire hydrants installed on private property shall be located as directed by the Guyana Fire Service Department and shall not be installed on a water main of 150 mm in diameter.

(j) **Stand-pipes - Water supply**

Standpipes shall be connected to a street water main with a fire water service at least equal to the size of the largest standpipe within the building, or shall be hydraulically calculated to satisfy the total demand. The size of the water service at the base of the standpipe risers, shall be at least the size of the largest standpipe.

(k) **Interconnection**

Water supply shall be connected to the base of each standpipe. Where more than one standpipe is required, they shall be interconnected at their base and an indicating valve shall be installed so as to permit individual risers to be taken out of service, if damaged, without interrupting the water supply to other risers.

Table 14

Provisions of stand-pipes in buildings

Occupancy Classification	When stand-pipes are required
A - ASSEMBLY All assembly occupancies	In buildings 3 or more storeys in height or with more than 1,000 m^2 in area per storey.
A-1, A-2 and A-3	In buildings 2 or more storeys in height and occupancy load of more than 300 persons.
B - BUSINESS	(a) In buildings 4 or more storeys in height regardless of floor area; and (b) Buildings 3 storeys in height and more than 300 m^2 in area per floor.
F- FACTORY	(a) In buildings 4 or more storeys in height regardless of floor area; and (b) Buildings 3 storeys in height and more than 300 m^2 in area per floor.
I- INSTITUTIONAL	In buildings 3 or more storeys in height or with more than 1,000 m^2 in area per floor.
M - MERCANTILE	(a) In buildings 4 or more storeys in height regardless of floor area; and (b) Buildings 3 storeys in height and more than 300 m^2 in area per floor.
R - RESIDENTIAL R-1 and R-2	In buildings 3 or more storeys in height or with more than 1,000 m^2 in area per floor.
S STORAGE	(a) In buildings 4 or more storeys in eight regardless of floor area; and (b) Buildings 3 storeys in height and more than 300 m^2 in area per floor.

Occupancy Classification	When stand-pipes are required cont'd
Public garages	(a) In buildings 4 or more storeys in height; (b) When more than 1,000 m^2 in area; or (c) When located in buildings where the upper storeys are designed for other use; or (d) When located in any basement storey or area

11.8 Fire service booster connections

11.8.1 Where required, all water sprinkler and standpipe systems shall be provided with at least one two-way Fire Service connection. Each inlet of the connection shall be 65 mm in diameter. The pipe from the standpipe system to the Fire Service connection shall be 100 mm.

Exception: A Fire Service connection shall not be required for limited area sprinkler systems.

11.8.2 Connections

Fire Service connection shall be arranged so that the use of any one water sprinkler connection will serve all the sprinklers, and the use of any one standpipe connection will serve all the standpipes within the building.

11.8.3 Location

Fire Service connections shall be located and be visible on a street front or other approved location such that immediate access can be made by the Guyana Fire Service Department. Obstructions such as fences, bushes, trees, walls etc. shall not be permitted. Where the connections would project beyond the property line or into a public way, a flush type connection shall be used.

11.8.4 Design and construction

Fire Service connections shall be 0.5 m and 1 m in elevation, measured from ground level to the centre line of the inlets. Inlet connections shall be fitted with checkvalves, or ball-drip valves, and caps and chains.

11.8.5 Signs

A metal sign with raised letters at least 25 mm in height shall be mounted on all Fire Service connections serving sprinklers and/or standpipes. Such signs shall read "**AUTOMATIC SPRINKLERS**" and/or **"FIRE STANDPIPES''**.

11.9 Automatic fire alarm systems

11.9.1 Plans and specifications

Plans and specifications for automatic fire alarm systems shall show the location and number of all sending stations and signals, with specifications of type, construction and operation of the system including all automatic detection devices. Installation of all equipment shall conform to the requirements of this Code and applicable Standards.

11.9.2 Where required, an automatic fire alarm system shall be installed and maintained in full operational condition in buildings of Occupancy Classifications I-1 Prisons, I-2 Hospitals and R-1 Hotels which accommodate more than 20 patients or sleeping rooms or suites.

11.9.3 Manual stations

A manual fire alarm system complying with **11.10** shall be installed in conjunction with an automatic fire alarm system.

11.9.4 Location of fire and smoke detectors

Fire and smoke detectors shall be installed in each guest room, suite or sleeping area. When actuated, the detector shall provide an alarm suitable to warn the occupants within the room or area. Detectors shall also be installed in access corridors, meeting rooms, foyers, staff rooms, toilets, kitchens and all ancillary spaces, basements or cellars.

11.9.5 Sprinklered buildings exception

Buildings or portions thereof equipped with an automatic fire sprinkler system are not required to have an automatic fire alarm system, but the area is required to have a manual fire alarm system complying with **11.10**.

11.9.6 Spacing of detectors

Fire and smoke detecting devices shall be installed not to exceed the lineal allowances or areas specified in the relevant standards or based on the criteria under which they were tested and approved.

11.9.7 Power supply and monitoring

Power for an automatic fire alarm system shall be provided from an emergency electrical system. All automatic fire alarm systems shall be of the closed circuit type and shall be electrically and/or mechanically supervised.

11.9.8 Audible and visual alarms

The operation of any detection device shall cause all audible and visual alarms to operate. Both visual and audible alarms shall be provided in occupancies housing the hard of hearing. Alarm sounding devices shall provide a distinctive tone and shall not be used for any other purpose than that of a fire alarm.
They shall be located so as to be effectively heard above all other sounds by all occupants in every occupied space within the building.

11.9.9 Zones

Each floor shall be zoned separately. If the floor area exceeds 2,000 m^2, additional zoning shall be provided. The length of any zone shall not exceed 60 m in any direction. Zoning indicator panels and controls shall be located as approved. Annunciators shall lock in until the system is reset.

11.9.10 Wiring

All connections and wiring, with signal devices disconnected, shall develop an insulation resistance of one megaohm.

11.9.11 Tests

Upon completion of a fire alarm system, the installation shall be subjected to a performance test to demonstrate its efficiency of operation.

11.10 Manual fire alarm systems

11.10.1 Plans and specifications

Plans and specifications for a manual fire alarm system shall show the location and number of all sending stations and signal with specifications of type, construction and operation of the system.

11.10.2 Where required, a manual fire alarm system shall be installed and maintained in full operating condition in:

(a) buildings equipped with an automatic alarm system;

(b) buildings of Occupancy Classification A-4- Educational of 3 storeys or more in height;

(c) buildings of Occupancy Group- B-Business of 3 storeys or more; or

(d) buildings of Occupancy Classification R-2 -Apartments of 4 or more storeys in height.

Exceptions: 1. Buildings of Occupancy Classification A-4 Religious.

2. Buildings of Occupancy Group B-Business that are equipped with an automatic sprinkler system.

11.10.3 Location

Manual alarm boxes shall be located in each common corridor of each storey, including basements. The alarm boxes shall be located 2 m from each exitway and the distance between any two boxes shall be 50 m. Where corridors are not provided, alarm boxes shall be located in such a way that no point in the building is 50 m from the alarm box. If the area contains a stage, then the fire alarm shall be located adjacent to the lighting control panel, switchboard or sub-board. The height of manual fire alarm boxes shall be 1.25 m above the floor level.

11.10.4 Power supply and monitoring

Fire alarm systems shall be of a closed circuit type and shall be electrically or mechanically supervised. Power supply, wiring alarm bells and/or signals, zones and acceptable tests shall be as for automatic alarm systems.

11.11 Hand operated portable extinguishers

11.11.1 Types

The usual types of portable fire extinguishers available are:

(a) carbon dioxide (CO_2): For small electrical fires;

(b) dry powder extinguishers: Small petrol, oil, or other combustibles; and

(c) bucket pumps: Where no water supply is available on temporary buildings or structures.

11.11.2 Where required portable fire extinguishers shall be installed where required by the Fire Service in buildings of any Occupancy Classifications that:

(a) are too small for a full alarm or suppression system, but need some first aid protection because of the nature of materials or equipment installed;

(b) in buildings where the early use of portable fire extinguishers by staff or tenants could be vital for fighting an outbreak of fire;

(c) in sections or areas of buildings that do have an automatic system but have been excluded from using water sprinklers or other systems such as in operating theatres or certain storage areas; or

(d) in temporary buildings erected for fairs, carnivals and other short term usage.

11.12 Smoke ventilation systems

11.12.1 Where required, in addition to any natural or mechanical ventilation required a smoke ventilation system shall be provided to vent smoke from fire compartments:

(a) in industrial buildings (Occupancy Groups F-Factory, H-Hazardous and S-Storage), where the fire compartment is without exterior openings for natural ventilation purposes, or where the floor area is more than 1,000 m^2;

(b) from the public corridors and other common areas in buildings of Occupancy Group I-Institutional and Occupancy Classification R-1 Hotel and R-2-Apartments, and where:

(i) the building is more than 3 storeys in height; and

(ii) the floor area of the compartment is more than 1,000 m^2;

(iii) the occupancy load of the fire compartment is more than 50 persons above ground floor, or more than 25 sleeping rooms located above ground floor.

(c) in all other buildings where the fire compartment is provided with air-conditioning or mechanical ventilation and:

(i) the air-conditioning or mechanical ventilation system serves more than one fire compartment; or

(ii) the floor area of the compartment is more than 1,000 m^2.

11.12.2 Acceptable systems of smoke ventilation

In buildings required to have smoke ventilation, such ventilation shall be provided, as appropriate in relation to the occupancy and size of the building, by the following methods:

(a) where the building has an air-conditioning or mechanical ventilation system: An emergency smoke exhaust mode shall be installed in the system which automatically activates when smoke is detected in the return air, such that:

(i) no recirculated air is supplied to any part of the building;

(ii) 100% fresh air is supplied to all compartments other than the fire affected compartment, but no return air is taken from those compartments; and

(iii) no air is supplied to the fire affected compartment, but air and smoke are exhausted from that compartment via the return air ducts.

(b) a mechanical smoke exhaust system which automatically activates when smoke is detected within the fire compartment (and any other mechanical ventilation or air-conditioning system serving the compartment shall shut down); and

(c) where the ceiling height of the compartment is not more than 12 m: Roof or wall vents shall be installed which automatically open when smoke or fire is detected in the fire compartment .

11.12.3 Return air in common corridors and lobbies

Where a fire compartment is required to have smoke ventilation and has an air-conditioning or mechanical ventilation system, the corridors and lobbies serving that compartment shall not be used to collect return air from the compartment.

11.12.4 Fire isolated stairways

In buildings over 6 storeys in height, fire-isolated stairways and smoke lobbies shall have a stair pressurisation system in accordance with **9.6.6**.

11.12.5 Ventilation of shafts - Other then elevators or dumbwaiter hoist- ways

All enclosed vertical shafts extending through more than 2 storeys of a building, except elevator or dumbwaiter hoist ways, shall be automatically vented to the outer air:

(a) by a metal skylight, roof vent, shutter or window of openable area,10% of the cross sectional area of the shaft, or with other suitable automatic means of removing hot air and gases; and

(b) the automatic operation shall be controlled by links designed to operate at a fixed temperature of 70^{o}C or by electrical or pneumatic operation under a rapid rise in temperature of 8^{o}C to 11^{o}C per minute, or by other suitable methods.

11.12.6 Fire vent stacks

When required wall or roof vents do not discharge directly to the outer air in each storey, one or more fire vent stacks of adequate capacity shall be installed to accommodate the discharge from the fire vent system in any floor or fire compartment, but an individual stack shall not be less than 0.4 m^2 in area, and all stacks shall terminate in an automatic crowl or ventilator outlet above the roof.

11.12.7 Location of stacks

The vent shall be located in a central position as practicable with respect to the floor area vented preferably in the vicinity of vertical shafts and shall extend continuously to the roof.

11.12.8 Vent control of stacks

The vent control of the vertical stacks shall consist of non-combustible dampers, shutters or a glazed metal sash designed to open outwardly. It shall be located 6 m from window openings or exitway doors in adjoining walls and shall be equipped with a thermostatic unit arranged to open at a predetermined rate of temperature rise. Auxiliary mechanical means for manual operation of all vent controls shall be provided from an accessible location.

11.12.9 Stack construction

The stack enclosure shall be constructed to be vapour and smoke-tight with walls of 2 h fire rating, and without openings other than the fire duct outlets and the top automatic ventilator outlet.

11.13 Fire ventilation of open wells

11.13.1 General

Open wells including unenclosed supplemental stairways and well openings for moving stairways not accepted as a required element of an exitway, shall be permitted in buildings of other than Occupancy Classification A-1- Theaters, A-2 Nightclubs, A-3-Public Halls, A-4 Schools and Occupancy Group I-Institutional, when equipped with an automatic fire suppression system and protected on every floor pierced by the opening with an automatic exhaust system or by other suitable method to prevent the passage of fire, smoke and gases to the storey above.

11.13.2 Exhaust system

The automatic exhaust system shall be a separate unit or integrated with an air-conditioning system, and shall be thermostatically controlled to operate simultaneously with the detection of fire.

11.13.3 Capacity of exhaust system

The exhaust system shall be of adequate capacity, to move hot air and smoke with sufficient velocity of flow over the entire area of the well opening under normal conditions of window and door openings in the building. In air-conditioned buildings, the system shall operate in a satisfactory manner with the normal air-conditioning fans shut off.

11.13.4 Draft stop

A draft stop shall be installed at each storey of the open well. The draft stop shall enclose the perimeter of the unenclosed opening and shall extend from the ceiling downward at 0.5 m on all sides. Automatic sprinklers shall be provided around the perimeter of the opening and within 0.6 m of the draft stop. The distance between the sprinklers shall be 2 m centre to centre.

11.14 Fire protection system monitoring

11.14.1 Fire protection indicator panel

A fire protection indicator panel:

(a) be installed as near as practicable inside the main entrance of any building which is not required to have a fire control room under **8.16** but which has any system for the automatic activation of fire protection devices or installed safety equipment such as:

(i) automatic release devices for fire doors;

(ii) thermal or smoke detection systems;

(iii) monitored fire sprinkler systems;

(iv) central air-conditioning or mechanical ventilation equipment with smoke control operation mode;

(v) emergency generators or battery emergency power storage; and

(vi) emergency lifts.

(b) indicate the floor or floors where an alarm or other monitored fire protection device has been activated in the building;

(c) have manual override and reset switches for all fire protection systems; and

(d) have a direct telephone line connection to the Fire Service monitoring facility.

11.14.2 Control valves

All flow test connections and points of fluid discharge shall be accessible to the Fire Service. If fire suppression control valves are located in a separate room or structure, a sign shall be provided on the entrance door with lettering of 100 mm in height and of a conspicuous colour, stating "**SPRINKLER CONTROL VALVES**" and/or "**STANDPIPE CONTROL VALVES**", or as necessary to indicate any other type of system installed. Identification tags shall be provided in accordance with relevant standards.

11.14.3 Provision of fire control rooms

A fire control room shall be provided in all buildings more than 6 storeys in height and in buildings more than 18,000 m^2 in area of Occupancy Group A-Assembly, F-Factory, H-Hazardous, M-Mercantile or S-Storage.

11.14.4 Location of fire control rooms

A fire control room shall open to the outside 6 m of a hard paved area large enough to accommodate a Fire Service vehicle. In a multi storey building, the fire control room shall be adjacent to the point of discharge of a fire-isolated stairway.

11.14.5 Emergency power supply

Electrical power for all building emergency systems shall be supplied from an emergency electrical system consisting of:

(a) for fire pumps, emergency lifts, smoke control equipment: Standby generator(s); and

(b) for emergency lighting, exit signs, fire and smoke alarm systems: Batteries with trickle-charger from main supply.

11.15 Maintenance

11.15.1 Maintenance responsibility

The owner, tenant or lessee of every building or structure shall be responsible for the care and maintenance of all fire protection systems, equipment and devices installed to ensure the safety and welfare of the occupants.

11.15.2 Testing

Equipment shall be inspected and tested at least each quarter of the year by the Fire Service, or by some approved reputable firm acceptable to the owner, Fire Service and Building Authority. A log of tests made shall be maintained by the owner and shall be available for inspection at any time by authorities.

Note: Although this Code requires sprinkler systems to be tested at quarterly interval, it is recommended that over a 4 year period, sections of the sprinkler system should be disconnected and sprinkler heads taken away to be pressure tested, and any that fail to meet the test requirements should be replaced.

11.15.3 Disconnection

Fire protection systems shall not be disconnected or otherwise rendered unserviceable without first notifying the Fire Service.

When the operation of a fire protection system is interrupted for reappraise or other reasons, the owner, tenant or person responsible for the premises shall immediately inform the Fire Service and shall diligently arrange repairs and restore the system as quickly as possible.

11.15.4 Checking of pipes and hoses

All water supply valves, leads, cut-offs, connections and other piping shall be checked for leaks and corrosion. Hose-reels, hydrants and other open outlets shall be checked for water pressure and flow. Checks shall be carried out to ensure that all valves are in satisfactory working condition.

Note: Representatives of the Fire Service may enter any building or compound at any reasonable time to make tests on water mains, valves or hydrants, if they have cause to suspect that there may be blockages, or that the supply has been interrupted or that valves are leaking or sticking or for any other valid reason.

11.15.5 Other fire extinguishing media

Carbon dioxide or other gas supplies and pressures from supply sources shall be checked and recorded, and dry powder containers checked for level of contents.

11.15.6 Alarm systems

Automatic and manual alarm systems shall be checked electrically and mechanically. Battery charge and circuits within buildings and from buildings to fire station, shall be tested and faults investigated promptly and corrected.

11.15.7 Hand operated portable extinguishers

All hand operated portable extinguishers shall be regularly tested by authorised testing agencies approved by the Fire Service and records kept of the dates when tests were carried out.

12 Appurtenances, equipment and installations

12.1 Application of this clause

This clause sets out fire safety precautions in the design and construction of appurtenances and in the installation of electrical wiring and equipment.

12.1 Furnaces, ovens, chimneys, pipes

12.2 (a) Furnaces, ovens, chimneys and flue pipes shall be constructed of non-combustible materials which will not be damaged by heat, condensation, or the products combustion; and shall be of such thickness and so constructed as to prevent ignition of any part of the building.

(b) The outlets thereto shall be so designed and sited as to prevent products of combustion from entering any buildings.

12.3 Electrical installations

(a) All electrical wiring, equipment and installations shall be installed and maintained by a competent person.

(b) All parts of electrical installations shall be so constructed, installed and maintained as to prevent damage by electric shock, fire and external explosion.

(c) The power supply to all electrical equipment shall be provided with means of cutting off current from the conductors in an emergency.

(d) All electrical appliances and outlets shall be clearly marked to indicate their purpose and voltage.

(e) Circuits and appliances carrying different voltages in the same installation shall be clearly distinguished by conspicuous means such as coloured markings.

(f) Only flame proof equipment and conductors shall be installed in explosive atmosphere as in store places for explosives or flammable liquids.

(g) Suitable warnings shall be displayed at all places where contact with or proximity to electrical equipment can cause dangers.

13 Fire safety during construction and demolition

13.1 General

All work relating to the erection, alteration, removal or demolition of any building structure or sign shall be undertaken in conformity with the provisions of this **Code and the Factories Act - Chapter 95:02 of the Laws of Guyana**.

13.2 Water supply

All buildings under construction or in the course of demolition shall have a water supply or material suitable for fighting incipient fires connected to the site before any actual building or demolition work is commenced, before offices or builders sheds are erected or before any combustible materials are delivered to the site.

13.3 Fire protection

13.3.1 Steel construction

(a) In every building of steel frame construction, the columns in all stairs below and above grade 1 to a point at least 9m above grade 1 shall be fireproofed as required by this Code before any part of the construction is erected in excess of 20m above grade.

(b) Subsequent construction shall not be carried out on more than 3 stairs in advance of fire proofing of the principal structural members.

(c) No part of the building shall be used for the storage of combustible material until such fire proofing or until the principal structural members of that part has been installed.

13.3.2 Reinforced concrete construction

In reinforced concrete construction, forms of combustible material shall be stripped and removed from the building as soon as practicable, and no part of such buildings shall be used for storage of combustible materials until such forms have been removed from that part of the building.

13.3.3 Fire extinguisher

During the entire construction/demolition period at least one approved fire extinguisher or other approved fire fighting equipment/device shall be provided and maintained in an accessible location.

13.3.4 Storage

Storage of combustible material shall not be permitted under or near welding operations. No part of the building shall be used for storage of combustible materials until effective fire proofing of that part has been installed.

13.3.5 Tool house

In every building operation wherever a tool house, store room or other shanty is placed, or a room or space is used for storage, dressing room or workshop, at least one approved hand pump, tank or portable chemical extinguisher shall be provided and maintained in an accessible location.

13.3.6 Fire hydrant

(a) During building operations, free access from the structure to fire hydrants where installed and to outside connections for stand pipes, sprinklers or other fire-extinguishing equipment, whether permanent or temporary, shall be provided and maintained at all times.

(b) No material or construction, equipment shall be placed within 3m of such hydrant or connection, or between it and the central line of the street.

14 Access for disabled persons

14.1 General

This clause sets out requirements to facilitate access to buildings and sanitary facilities for people with physical disabilities.

The provisions of this clause shall apply to all levels and areas used by the general public, employees, persons visiting or on the premises for any reason, and shall apply to all Occupancy Classifications except R-3 Houses, and Occupancy Group T-Temporary.

It is particularly applicable to transport (airport and seaport) terminals used by patients in transit.

All buildings used by the public shall meet additional requirements for accessibility, easy internal circulation and swift egress by disabled persons.

Minimum provisions shall be made for facilities to allow ease of access of handicapped persons in wheelchairs using public buildings such as post offices, hospitals, asylums, sanotaria, assembly halls, hotel, cinemas, etc.

All building designers shall be aware of the requirements of the **Guyana's Disabilities Act**.

Where it can be demonstrated that one or more of the following provisions is not applicable to the proposed use and occupancy, modifications may be sought and a dispensation obtained from the Building Authority.

14.2 Access to building

14.2.1 Building entrance

At least one primary entrance at each ground floor level of a building shall be accessible from the parking lot or the nearest street by means of walkway uninterrupted by steps or abrupt changes in grade and shall have a width of 1.5 m and a gradient of 1.20 or a ramp meeting the requirements, except for enclosure.

14.2.2 Parking lots and building approaches

Any parking lot serving a building required to be accessible to handicapped persons shall have level parking spaces as specified in **Table15** identified by signs as reserved for physically handicapped persons. Each reserved parking space shall be 3.6 m wide.

Table 15

Accessible parking space for the physically handicapped

Total parking space in lot	Required number of accessible spaces
Up to 50	1
51 - 75	2
76 - 100	3
101 - 200	4
201 - 500	5
Above 500	1 % of total number

14.2.3 Location of parking spaces

Parking spaces for the physically handicapped shall be located as close as possible to elevators, ramps, walkways, and entrances. Parking spaces shall be located so that physically disabled persons are not compelled to wheel or walk behind parked cars to reach entrances, ramps walkways and elevators.

14.2.4 Kerbs

Where a kerb exists between a parking lot surface and sidewalk surface, an inclined kerb approach or a kerb cut with a ramp of not steeper gradient than 1:12 and width 1.25 m shall be provided for wheelchair access.

14.2.5 Interior access

Interior means of access to all floor levels required to be accessible for the physically disabled shall be provided by ramps meeting the requirements of section or lifts, and access to all points on each floor level shall be provided by means of passageways or corridors 1.25 m wide (except as permitted in dwelling units under **14.3.2**).

14.2.6 Electrical switches, controls, fire alarms, telephones

In buildings required to be accessible by physically disabled persons, the following provisions are required:

(a) light switches, controls and fire alarms, shall not be located at a height above floor level than 1.25 m; and

(b) where public or pay telephones are installed, one telephone shall have the dial, coin slot and handset mounted 1.25 m above the floor level.

14.2.7 Elevators (Lifts)

If interior access in a multi-storey building required to be accessible by the physically disabled is provided by lift(s), at least one lift shall meet the following requirements:

(a) fire escape for disabled persons shall not be dependent lift;

(b) lifts shall be easily accessible on all floors and at ground level, shall lead directly to the entrance;

(c) the elevator cab shall have a clear area of 2 m^2 with a minimum dimension of 1.4m;

(d) the lifts door shall have a minimum clear opening width of 800 mm;

(e) the control buttons shall be located 1.4 m above the floor in manual controlled lifts without an attendant;

(f) brailled fireman lift plates shall be provided adjacent to all cab control buttons and switches;

(g) braille plates provided for floor designation shall be fixed on the wall of each storey, 1.4 m above the floor at the open side of the elevator door;

(h) handrails shall be provided at a height between 600-2400 mm; and

(i) lifts shall be self - levelling with a maximum tolerance of 25 mm.

14.2.8 Turnstiles and checkout lanes

Buildings which utilise turnstiles to control traffic or check-out lanes which would not accommodate a wheelchair, shall provide a clearly marked alternative route for the physically disabled which is a least 1 m wide.

14.3 Residential buildings

14.3.1 Hotels

In buildings Occupancy Classification R-1 Hotels, at least 1 bedroom unit for each 25 bedroom units or part thereof shall be made accessible to physically handicapped persons. The bedroom units allocated for the physically handicapped shall be proportionately distributed throughout all types of units. All public facilities such as function rooms, reception areas, lounges, bars, restaurants and shops shall be accessible from the barrier free units. Access to additional floors without public facilities is not required.

14.3.2 Design of dwelling units

In dwelling units designed for the use of physically handicapped persons:

(a) corridors and passageways shall be 1 m wide;

(b) in kitchen, a clearance of 1370 mm shall be provided in front of all cabinets, work surfaces, counter tops and appliances; and knee space shall be provided under the sink to accommodate persons in wheel chairs;

(c) in laundries, a clearance of 1370 mm shall be provided in front of laundry tubs, washers and driers; and

(d) at least one bedroom shall be specially designed to allow free movement of a wheel chair within the room, and any attached bathroom, walk-in clothes closet or wardrobe floor shall be at the same level as the floor of the room it serves.

14.4 Access to sanitary facilities

14.4.1 Toilet rooms

At least one toilet room and one fixture within such room shall be accessible to and usable by, physically disabled persons. A toilet room shall have a clear space whether access way, lobby or passageway beyond the room door swing of 1.5 m by 1.5 m.

14.4.2 Water closets

Water closets required to be accessible to disabled persons shall:

(a) have a clearance between the doorway of the water closet stall and a wall opposite the entrance of 1.25 m;

(b) be 1.25 m wide, 1.65 m to 2.0 m deep, and have a doorway opening at 800 mm wide with a door (if any) swinging outwards;

(c) have handrails 1070 mm long, and 25 mm and not more than 32 mm diameter on both sides of the water closet, mounted 850 mm above and parallel to the floor, with the front end positioned 610 mm in front of the water closet pan; and

(d) have a water closet pan with the seat not higher than 500 mm from the floor, and a narrow understructure that recedes sharply from the front and a trap that does not extend in front of or flush with, the lip of the bowl. (Where only one water closet is required in the facility, a standard height model shall be used).

14.4.3 Urinals

If a toilet room for men has a wall- mounted urinal the opening of the basin shall be 480 mm from the floor, or floor-mounted urinals that are level with the main floor of the toilet room shall be provided.

14.4.4 Equipment and fittings

A shelf disposal unit, or the lower edge of a mirror shall be 1 m above the floor. A towel or other dispenser, or electrical hand dryer shall be 1.25 m above the floor.

14.5 Signs

14.5.1 International signs

All buildings erected or altered which are required to comply with this Code shall have the international symbol of accessibility for disabled persons prominently displayed in positions as follows:

(a) at the main entrance to the building. If the access ramp for wheelchairs is not actually at the main entrance, then it shall have a directing arrow or notice attached, for example: "**Access via South Door - 50 m**";

(b) adjacent to the actual ramp access if this is not at the main entrance;

(c) on doors of all toilet areas, water closet cubicles, or rest rooms designed for the use of handicapped persons;

(d) adjacent to lifts/elevators installed for wheelchair access; and

(e) on the signs in parking lots reserved for physically disabled persons.

14.5.2 Size of signs

Signs at the main entrance of the buildings shall be 150 mm^2. Signs on doors and adjacent to lifts shall be 50 mm^2. These shall follow the International symbol for disability.

14.6 Design recommendations

14.6.1 Design standards

Although not mandatory requirements for this Code, the following list of recommendations is for the information and guidance of designers, builders and others.

Further details and information on access to buildings by physically disabled, aged, or otherwise disabled persons which include access to toilets and other rooms, recommended heights of handrails, grab-rails, toilet and other fixtures, widths of passageways and doors, etc. can be obtained from the latest edition of the **International standard**, **- ISO Needs of Disabled People in Buildings; BS 5810; AS 1228; or Supplement No.5 to the National Building Code of Canada.**

14.6.2 Unisex toilet facilities

Wheelchair confined males are often accompanied by their wife, mother, sister or daughter, and females confined to wheelchairs are sometimes accompanied by their husband, father, brother or son, hence toilet and/or wash rooms for the disabled shall be treated as "unisex" facilities and accessible from passages or lobbies rather than from either male or female toilets areas.

14.6.3 Doors

Doors to wash/toilet areas for the handicapped shall always open out and be equipped with self-closing hinges, rising butts, or door closers. They shall have either horizontal or vertical pull/push bars rather than handles, and a suitable indicator catch showing "vacant" or "occupied".

In toilets and washrooms used frequently by wheelchair patients (that is, in institutions, rest homes, hospitals) the entrance door shall have a bell or buzzer outside, operated from pull cord or push/button inside for patients to summon aid.

14.6.4 Grip bars and handrails

Ramps shall have handrails on at least one side. Handrails shall be easy to grip. If circular, a diameter of 45 mm, or more than 51 mm is preferred. Vertical grip rails as well as horizontal are recommended.

14.6.5 Position of fittings

The water closet flushing handle or button as well as toilet paper holder shall be placed where they can be reached by a person seated on the wheelchair. Drinking fountains shall not be fully recessed in walls or alcoves and be set lower for wheelchair confined persons.

14.6.6 Passageway width

Passage and corridors in buildings used by disabled persons shall not be less than 1.25 m wide.

14.6.7 Floor finish

Floors and ramps shall have a non-slip surface.

14.5.8 Viewing platforms

Viewing platforms or spectator or seating areas in assembly buildings such as theatres, airport terminals, sporting complexes, and the like, shall have special areas set aside for wheelchair viewers devoid of any other fixed seating arrangements and the areas shall be in such a position as not to interfere with egress ways from seated areas. Access shall be by ramps not steeper than 1:14.

14.6.9 Walks, ramps, entrances and corridors

(a) Walks shall be a minimum of 2 m without abrupt level changes;

(b) Ramps shall have a maximum slope of 1:20 and shall have easy to grip handrails on both sides at a height of 2,400 mm to 300 mm measured from ramp surface to rail top;

(c) Every 900 - 2,700 mm change of direction of walk or ramp shall have a level platform of 1,800 - 2,700 by 1,800 - 2,700 mm;

(d) Curbs shall not be higher than 100 mm and shall be cut for wheel chair access;

(e) At every entrance there shall be a level platform of 1,950 mm;

(f) The circulation space of walks, ramps and corridors shall be clear of obstructions and projections;

(g) Principal entrances/exits shall provide for easy access and egress for wheel chair users:

(i) all other entrances/exits shall provide for easy access and egress for ambulant disabled persons;

(ii) all doorways shall be 900-2,700 mm, principal doorways shall be 1,800-2,700 mm;

(iii) all doors shall be operable in a single motion with one hand and shall have a clear swing of 2,700 mm;

(iv) door latches, handles and pull bars shall be easy to grasp and between 900 - 2,700 mm and 900 mm high; and

(v) doors with a single means of egress shall swing out but shall be recessed if on a corridor.

(h) Corridors shall be 1,200 mm - 2,700 wide; main corridors shall be 1,800 - 2,700 mm wide.

14.6.10 Surface finish

(a) All floors, stairs and walk surface shall be of non-slip finish.

(b) Where used, carpet shall be low pile, high density with thin, firm pads.

14.6.11 Steps and stairs

(a) All risers shall be slanted or levelled. No open riser or risers with nosing shall be allowed.

(b) Maximum riser height shall be 175 mm.

(c) Minimum tread width shall be 300 mm.

(d) Easy-to-grasp handrails with a 38 mm clearance from wall shall be set at both sides of stairs at a height between 600 -2,400 mm and 600 - 3,300 mm with a cross section not exceeding 2 mm.

14.7 Relevant guidelines

The latest edition of the following can be used as guidelines to provide designers with detailed information on the design of barrier free facilities:

(a) barriers free means of escape for disabled persons;

(b) barrier free design - A National Standard for Canada, Canadian Standards Association, June 1990; and.

(c) building without barriers for the disabled. Sarah Harkness and James N. Groom. Junior Whitney Library Design, 151 Broadway. New York 10036.

National Standards Council

National Standards Council is the controlling body of the Guyana National Bureau of Standards (GNBS) and is responsible for the policy and general administration of the Bureau.

The Council is appointed by the Minister as indicated in the GNBS Act, 1984. Using its powers in the Standards Act, the Council establishes committees for specified purposes.

A Guyana standard is a standard which has been approved by the Standards Council and one which reflects reasonable agreement among the views of a number of capable individuals whose collective interests provide to the greatest practicable extent a balanced representation of producers, consumers, users and others with relevant interests, as may be appropriate to the specific subject.

Preparation of Documents

The following is an outline of the procedure which shall be followed in the preparation of documents:

1. The preparation of standard documents is undertake upon the Standards Council authorisation. This may arise out of requests from national organisations, Bureau staff, or technical committees, or if none exists a new committee is formed, or project is others with relevant interests, as may be appropriate to the specific subject.

2. If necessary, when the final draft is read, any other Minister who might be responsible for any area which the standard may affect, is approached to obtain formal concurrence.

3. The final draft document is made available for general comments. In addition, copies are forwarded to those known to be interested in the subject.

4. The Technical Committee considers all the comments received and recommends a final document to the Standards Council for approval.

5. The Standards Council approves the document and notifies the Minister its publication.

6. The declaration f the standard is gazetted and copies placed on sale.

7. On the recommendation of the Standards Council, the Minister may declare a standard compulsory.

8. Amendments and revisions of the standards normally require the same procedure as it applied to the preparation of the original standard.

Purchase of Guyana Standards should be addressed to:

Guyana National Bureau of Standards
Flat 15, Sophia Exhibition Complex,
Sophia, Georgetown
GUYANA