

***GUIDELINES***  
***FIRE SAFETY REQUIREMENTS***

**COMMERCIAL SECTOR**

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# 1 INTRODUCTION

- 1.1 These guidelines describe basic fire safety requirements for the COMMERCIAL SECTOR.
- 1.2 In the commercial cluster activities may be grouped as-
- (a) distribution of goods, import/export agencies, retail warehouses;
  - (b) general retailer foodstuff/non foodstuff shops, markets, supermarkets;
  - (c) retail of hazardous materials which have been classified in The Dangerous Chemical Control Act 2004;
  - (d) Petrol service stations retailing inflammable liquids as fuel;
  - (e) Petrol service stations retailing auto gas as fuel.
- 1.3 The place of work can be accommodated in a wide range of building of various design, size and structural materials. The buildings may be single or multiple floor built specifically for the purpose, multiple occupancy, private residential buildings, or any other building converted for the purpose.
- 1.4 These fire safety requirements cover the place of work and aim at ensuring safety with regard to fire.
- 1.5 The promoter or his nominated agent is responsible to adhere to these fire safety requirements.

# 2. FIRE SAFETY REQUIREMENTS

- 2.1 Fire safety requirements are commensurate with-
- (a) the number of persons involved in the commercial activity;
  - (b) the type of commerce and processes involved;
  - (c) the layout, size, design and nature of construction of the place of work;
  - (d) the fire load and level of risk within the place of work.
- 2.2 The main features which are of relevance with regard to fire safety requirements are-
- (a) the means of escape;
  - (b) the means available for fighting fire;
  - (c) the means for giving warning in case of fire; and
  - (d) basic fire preventive measures.
- 2.3 Any promoter desiring to develop and invest in the commercial sector shall ensure that the building in which the activity is to be carried out (“the relevant building”) satisfies the requirements in relation to the means of escape, the means available for fighting a fire and means for giving warning in case of fire and precautions to be taken with respect to any hazardous materials stored, used or handled on the premises.
- 2.4 The promoter shall conduct a fire risk assessment to determine the requirements of fire safety and shall adhere to those requirements specific to his/her case – (Inspection Check list enclosed at **Annex 1**).

2.5 These fire safety requirements shall be deemed to be satisfied when the design, construction, equipment and installation comply with one of the following three level of approaches-

(a) General approach:

This level is applicable to a majority of building work undertaken within the country. Fire precautions designed into the building usually follow these fire safety requirements and other national prescriptive documents published to support legal requirements.

(b) Advanced approach:

This is the level for which BS 9999 is provided. Guidance provided gives a more transparent and flexible approach through use of a structure process to risk-based design to account for different fire and human factors.

(c) Fire safety engineering:

This is the level for which BS 7974 is provided. This level provides an alternative approach to fire safety and can be the only practical way to achieve a satisfactory standard of fire safety in some large and complex buildings.

Note:-Approaches (b) and (c) shall be discussed and agreed by the promoter and the Chief Fire Officer prior to the latter's approval.

### 3. **MEANS OF ESCAPE**

3.1 Every promoter shall ensure that people who are in the relevant building have the means of escaping of the building safely and quickly in the event of a fire.

3.2 The means of escape shall be a structural and integral part of the construction and shall allow people to proceed to a place of safety in the event of a fire.

3.3 The means of escape includes exit doors, corridors and staircases which lead to the open air.

3.4 A single route shall be accepted as means of escape where-

- (a) the distance to be travelled to reach the final exit is 10 metres in case of high hazard and 15 metres in other cases;
- (b) the route to the final exit is protected and is at least 1.1 metre wide;
- (c) the habitable floor height does not exceed 9 metres; and
- (d) the total number of persons in the relevant building does not exceed 60 other than ground floor.

**Note** – “Protected route” means a route to final exits which is rendered safe from heat, smoke or toxic vapours that may be produced, in the event of fire, by the provision of fire- resisting material, fire doors or by pressurisation.

3.5 In circumstances where the conditions are beyond those specified in 3.4 an alternative means of escape shall be required.

3.6 Spiral staircases and vertical ladders shall not be acceptable as alternative means of escape.

3.7 At ground floor level, an exit alternative to the existing one shall be acceptable as an alternative means of escape.

- 3.8 In building above ground floor level a standard staircase made of metal or other non-combustible material shall be acceptable as an alternative means of escape.
- 3.9 All staircases forming part of the means of escape shall be on a continuous plane from the highest floor to ground floor and from the lowest floor in basement to ground floor.
- 3.10 An external staircase shall be acceptable as an alternative means of escape, provided that-
- (a) there is limited opening on the side where the staircase is sited;
  - (b) windows do not open directly on the staircase;
  - (c) materials used are protected against corrosion and slips;
  - (d) the staircase is illuminated during night.
- 3.11 A staircase shall satisfy the following specifications:-
1. it shall not be less than 900 millimetres wide;
  2. treads shall not be less than 225 millimetres;
  3. risers shall not be more than 190 millimetres;
  4. the angle of descent shall not exceeds 45 degrees;
  5. there shall be not more than 16 risers in a flight;
  6. there shall be not more than 2 flights without a change in direction;
  7. all doors giving access to the staircase shall, except in the case of sliding door, be constructed to open outwards;
  8. handrails, walls or grills with minimum height of 900 mm shall be provided on open sided staircases;
  9. railings shall be provided for stability or support on both sides, except staircase that are less than 1250 mm can have a handrail on one side only.
- 3.12 Exit doors, corridors and staircases shall be kept free from obstruction at all material time.
- 3.13 All doors affording means of emergency from a building shall, except in the case of sliding door, be constructed to open outwards.
- 3.14 Whenever a building is occupied, emergency exit doors shall not be locked or fastened in such a manner that they cannot be easily and immediately opened from inside.
- 3.15 The contents of any room shall be arranged in such a way so as to allow free circulation for occupants.
- 3.16 Every exit door affording means of escape shall be marked by a white pictogram of minimum size 100 millimetres on a board with green background.
- 3.17 When the direction to the emergency exit may not be apparent to an occupant, an exit sign with an arrow indicating direction to the exit shall be conspicuously displayed.
- 3.18 If occupancy is permitted at night or if normal lighting levels are reduced during working times, exit signs shall be illuminated and emergency lighting shall be provided along all areas forming the escape routes.

#### 4. **MEANS FOR FIGHTING FIRE**

- 4.1 Every promoter shall provide fire fighting equipment of suitable type specific to the circumstances of his/her case as mentioned below.
- 4.2 Fire fighting equipment shall include portable fire extinguishers and hose reels system.
- 4.3 Four types of portable fire extinguishers using water or foam, or dry powder or carbon dioxide are available.
- 4.4 A water fire extinguisher is appropriate for fire involving solid materials normally of an organic nature in which combustion occurs with the formation of glowing embers. (“Class A fires”), e.g. wood, paper, textiles, clothing.
- 4.5 A foam fire extinguisher is appropriate for fires involving liquids or liquefied solids (“Class B fires”), e.g. petrol, oil, thinner.
- 4.6 A dry powder fire extinguisher is appropriate for fire involving solid materials normally of an organic nature in which combustion occurs with the formation of glowing embers, liquid or liquefied solids, gases and metals. (“Class A, B, C and D fires”), e.g. wood, paper, textiles, clothing, petrol, thinner, oil and electrical appliances.
- 4.7 A carbon dioxide fire extinguisher is appropriate for fire involving solid materials normally of an organic nature in which combustion occurs with the formation of glowing embers, liquid or liquefied solids, gases (“Class A, B and C fires”), e.g. wood, paper, textiles, clothing, petrol, thinner and electrical appliances.
- 4.8 These fire extinguishers are available in capacity of 9 litres for water and foam, 2 kg and 5 kg for carbon dioxide, 2 kg, 4 kg, 6 kg and 9 kg for dry powder type.
- 4.9 One 4 kg dry powder or one 2 kg carbon dioxide fire extinguisher is recommended for every 100 square metres or part thereof, according to the risk except for storage of hazardous materials.
- 4.10 Portable fire extinguishers shall be preferably sited on the line of escape routes, near room exits, inside or outside depending on the risk.
- 4.11 In multi-storey buildings, portable fire extinguishers shall be sited at the same position on each floor, i.e top of stairs flights or at corner of corridors, where possible in groups forming fire points, where possible, in shallow recess.
- 4.12 Portable fire extinguishers shall be installed in such a way that the carrying handle lies one metre off the floor level.
- 4.13 In large buildings, portable fire extinguishers shall be sited in such a place so that no person shall travel more than 30 metres to reach them.
- 4.14 Portable fire extinguishers shall be maintained in operational order at all material times.
- 4.15 The equipment shall be inspected and tested once yearly. A record of such inspection and test shall be kept.

- 4.16 A hose reel installation which is a first aid fire fighting equipment shall be provided on the premises to extinguish ordinary combustible materials such as wood, cloth, paper and any matter that produces an ash (“Class A fires”); where portable fire extinguishers will be insufficient.
- 4.17 Such installation consists essentially of a reel, inlet pipe, manual or automatic valve (as the case may be), hose and a shut-off nozzle.
- 4.18 The drum or hose support of the first coil of hose shall be not less than 150 millimetres in diameter. The fittings to which the hose is attached shall be arranged in such a way that the hose is not restricted by additional layer of hose, being place on it.
- 4.19 The reel shall be of sufficient size to carry the length of hose and rotate around a spindle so that the hose can be freely run out.
- 4.20 If a *manual inlet* valve is provided, it shall be of screw-down type above ground stop valve or gate valve type. It shall be closed by running the handle in a clockwise direction. The direction of opening shall be indicated by an arrow marked on the handle.
- 4.21 If the valve is *automatic*, the valve shall be opened automatically when the hose is run out of the reel after 4 complete revolutions.
- 4.22 The hose shall be of 20mm or 25mm nominal diameter and conform to BS EN 694, not exceeding 30m in length.
- 4.23 A nozzle of 4.5 millimetres to 6.5 millimetres capable of providing either jet or spray shall be incorporated at the end of the hose reel.
- 4.24 A hose reel installation shall be connected to a permanent water supply which is under pressure.
- 4.25 In vertical installations (tall buildings) the hose reel shall provide a jet of approximately 6 metres and the output shall be at least 24 litres per minute as follows:
- | <b>Nozzle diameter</b> | <b>Minimum running pressure at the entry of reel</b> |
|------------------------|--|
| 6.5 millimetres        | 1.5 bar  |
| 4.5 millimetres        | 4 bar  |
- 4.26 In horizontal installations, the output shall be at least 24 litres per minute.
- 4.27 One hose reel shall be provided to cover every **500m<sup>2</sup>** of floor space or part thereof.
- 4.28 Hose reels shall be sited in prominent and accessible positions at each floor level adjacent to exits in corridors on exit routes, in such a way that the nozzle of the hose can be taken in very room and within 6 metres of each part of a room.
- 4.29 Fire hose reel assemblies shall be provided with a notice bearing the words “FIRE HOSE REEL” in white letters of not less than 100 millimetres on a red background. The methods of operation of the valve shall be displayed adjacent to each assembly.

4.30 Every hose reel installation shall be maintained in operational order at all material time. The installation shall be tested once yearly and a record shall be kept thereof.

## 5. **MEANS FOR GIVING WARNING IN CASE OF FIRE**

5.1 A fire alarm system is required in the relevant building for one or both of the following purposes-

- (a) to enable people in the building to be informed of an outbreak of fire and evacuate the building before the escape routes are affected by the fire.
- (b) to enable early detection and mitigate damage that may be caused by the fire by activating fire-fighting resources.

5.2 Every promoter in the commercial sector shall ensure that a fire warning system is installed at his/her place of work;

- (i) where the number of persons exceeds 60, or
- (ii) if the habitable height of the building exceeds 9 metres, or
- (iii) where a Certificate of Registration is issued under Inflammable Liquids and Substances Act 1952, or
- (iv) where persons with impaired vision or hearing are working, or
- (v) depending upon the level of risk.

5.3 A fire alarm system consists basically of break-glass manual call points which are wired electrically to, an audible and visual fire warning system and a control indicator panel. The sound shall be distinctive and at least 5 decibel above normal noise on the premises.

5.4 Break-glass call points shall be installed at 1.4 metres above floor level, preferably near exit and emergency staircase. In large buildings no one shall have to travel more than 30 metres to reach a call point.

5.5 An audible and visual fire warning system shall be provided in the premises as the case may be. The fire-warning signal shall be audible or perceptible throughout the premises. The visual warning system shall be distinctive and conspicuously sited.

5.6 Depending on the risk and in exceptional circumstances standalone fire alarm system can be considered.

5.7 The basic system can be enhanced by introducing automatic fire detectors.

5.8 Fire detectors are designed to detect one or more of the 3 characteristics of a fire: heat, smoke or flame.

5.9 No one type is suitable for all applications and the final choice depends on the individual circumstances as explained below.

5.10 Heat or smoke detectors are suitable for most buildings. Flame detectors are mainly used to supplement heat or smoke detectors in high compartments or outdoor wide area storages.

5.11 A fire warning system shall be designed and installed in accordance to BS 5839 (British Standard for Fire Alarm System) or any other equivalent standard.



5.12 Every component of the system shall be tested in accordance to BS 5839 and maintained in operational order. A record of the test shall be kept.

## 6. STORAGE/RETAIL OF INFLAMMABLE LIQUIDS AND SUBSTANCES

### 6.1 *Liquefied Petroleum Gas – LPG*

A Certificate of Registration is required where the storage or handling of liquefied petroleum gas in bulk or in cylinders exceeds 500 kg.

#### 6.1.1 *If the total weight of LPG in single cylinder up to 50 kg used stored or handled does not exceed 500 kg.*

- (a) cylinders shall be kept upright in a well-ventilated place, preferably outside the building and away from any source of heat, combustible materials and electrical circuits;
- (b) cylinders shall be kept away from exits or area used for circulation of people. Cylinders shall not be kept under stairways;
- (c) cylinders shall be kept in areas where it will not be physically damaged;
- (d) cylinders shall be secured to prevent them from falling or being knocked over and shall be on flat and firm surfaces;
- (e) fittings recommended for the equipment shall be used;
- (f) appliances and accessories shall be maintained in good working order;
- (g) the rubber hose/other connections and regulator shall be in good working condition;
- (h) Rubber hose/ tubing's and regulator shall be replaced before the expiry dated as stated on the items and as recommended by manufacturers;
- (i) Empty cylinders shall be kept away from full cylinders;
- (j) A One 4 kg dry powder fire extinguisher shall be provided;
- (k) signs of "DANGER – No SMOKING" in letters of not less than 100 millimetres shall be conspicuously displayed near the LPG storage area.

#### 6.1.2 *If the total weight of LPG in single cylinder up to 50 kg used, stored or handled exceed 500 kg but does not exceed 1650 kg*

- (a) cylinders shall be designed, fabricated, listed and marked(stamped) in accordance with regulations;
- (b) defective cylinders shall be returned to supplier;
- (c) cylinders and systems shall be secured against accidental dislodgement;
- (d) storage, use and handling areas shall be secured against unauthorised entry;
- (e) cylinders and system shall be protected from physical damage;
- (f) guard posts or other means shall be provided to protect compressed gas cylinders and system from vehicular damage;
- (g) cylinders shall be separated from combustible material, waste, vegetation , source of heat and conditions that present exposure hazard to or from each other;
- (h) cylinders shall be protected from direct contact with soil or surfaces where water might accumulate, in order to prevent bottom corrosion;
- (i) the layout plan of installation shall be submitted to the Mauritius Fire and Rescue Service to ensure conformity;
- (j) one 9 kg dry powder fire extinguisher shall be provided;
- (k) signs of "DANGER– No SMOKING" in letters of not less than 100 millimetres shall be conspicuously displayed.

6.1.3 If the total weight of LPG in single cylinder up to 50 kg used, stored or handled exceed 1650 kg

In addition to requirements highlighted in section 6.1.2 (a) to (k) where the total weight of gas in cylinders exceeds 1650 kg the cylinders shall be stored in a storage shed separate from any other buildings and boundary as follows-

<b>Weight in kg</b>	<b>Distance in metre</b>
1 Where the weight of the gas exceeds 1650 kg but does not exceed 3300 kg	5
2 Where the weight of the gas exceeds 3300 kg but does not exceed 4950 kg	8
3 Where the weight of gas exceeds 4950 kg	15

The storage shed shall be constructed as follows-

- (a) be constructed of stone, brick, concrete or other approved fire-resisting material.
- (b) have a door in an outside wall thereof which shall be so constructed as to open outwards.
- (c) have adequate ventilation provided at the top and bottom of in outside wall.
- (d) in no case have any door or ventilation in an inside wall between the store and the premises to which it is attached.

6.1.4 If the total weight of LPG in Bulk Tank used, stored or handled does not exceed 500 kg

- (a) tanks shall be designed, fabricated, listed and marked (stamped) in accordance with regulations;
- (b) defective tanks shall be returned to supplier;
- (c) tanks and systems shall be secured against accidental dislodgement;
- (d) storage, use and handling areas shall be secured against unauthorised entry;
- (e) tanks and system shall be protected from physical damage;
- (f) guard posts or other means shall be provided to protect compressed gas tanks and system from vehicular damage;
- (g) tanks shall be separated from combustible material, waste, vegetation , source of heat and conditions that present exposure hazard to or from each other;
- (h) tanks shall be protected from direct contact with soil or surfaces where water might accumulate, in order to prevent bottom corrosion;
- (i) the layout plan of installation shall be submitted to the Mauritius Fire and Rescue Service to ensure conformity;
- (j) the gas storage installation shall be protected by a water spray system;
- (k) one 9kg dry powder fire extinguisher shall be provided;
- (l) signs of “DANGER-No SMOKING” in letters of not less than 100 millimetres shall be conspicuously displayed;

6.1.5 If the total weight of LPG in Bulk Tank used, stored or handled exceed 500 kg but not 1650 kg

- (a) tanks shall be designed, fabricated, listed and marked(stamped) in accordance with regulations;
- (b) defective tanks shall be returned to supplier;
- (c) tanks and systems shall be secured against accidental dislodgement;
- (d) storage, use and handling areas shall be secured against unauthorised entry;
- (e) tanks and system shall be protected from physical damage;
- (f) guard posts or other means shall be provided to protect compressed gas tanks and system from vehicular damage;

- (g) tanks shall be separated from combustible material, waste, vegetation , source of heat and conditions that present exposure hazard to or from each other;
- (h) tanks shall be protected from direct contact with soil or surfaces where water might accumulate, in order to prevent bottom corrosion;
- (i) the layout plan of installation shall be submitted to the Mauritius Fire and Rescue Service to ensure conformity;
- (j) the gas storage installation shall be protected by a water spray system;
- (k) one 9kg dry powder fire extinguisher shall be provided;
- (l) signs of “DANGER-No SMOKING” in letters of not less than 100 millimeters shall be conspicuously displayed;

6.1.6 *If the total weight of LPG in Bulk Tank used, stored or handled exceed 1650 kg*

In addition to requirements highlighted in section 6.1.5 (a) to (l) where the total weight of gas in bulk tank exceeds 1650 kg the tank shall be stored in a storage shed separate from any other buildings and boundary as follows-

<b>Weight in kg</b>	<b>Distance in metre</b>
1 Where the weight of the gas exceeds 1650 kg but does not exceed 3300 kg	5
2 Where the weight of the gas exceeds 3300 kg but does not exceed 4950 kg	8
3 Where the weight of gas exceeds 4950 kg	15

The storage shed shall be constructed as follows-

- (i) Shall be constructed of stone, brick, concrete or other approved fire- resisting material and shall have a solid floor of similar material.
- (ii) Shall be so constructed that any door thereof opens outwards.
- (iii) Shall have adequate ventilation provided at the top and bottom of the walls thereof.
- (iv) No other matter or substance shall be placed in a storage shed with bulk tanks containing gas.
- (v) No valve of any bulk tank containing gas shall be opened in a storage shed and no other work shall be permitted or carried on within a storage shed unless the area is separated by a properly constructed wall.

6.2 ***Inflammable Liquids – M/Spirits, Alcohol, Kerosene, etc***

6.2.1 Promoters of the commercial sector shall be allowed to use, store and handle inflammable liquids up to a maximum of 200 litres, if the liquid has a flash point of 22.7°C or less or 400 litres if the liquid has a flash point between 22.7°C to 43°C.

6.2.2 If the quantity used/stored or handled exceeds the quantity mentioned in 6.2.1 the promoter shall keep the liquid in a store constructed for the purpose.

- 6.2.3 The store shall be constructed according to the following specification-
- (a) the walls shall be constructed of brick, stone, concrete or other non-inflammable material, the floor of concrete or other impervious material and the roof of reinforced concrete or other non-inflammable material;
  - (b) the store shall be provided with a well-fitted metal sliding door, or a metal door opening outwards of not less than 3.5 millimetres thick, carried on an iron door frame. Such door shall have an all-round over-lap of not less than 50 millimetres and shall be fitted with a substantial lock;
  - (c) window frames shall be constructed of metal and fitted with fire resisting glass panes or metal sheets;
  - (d) Every store shall be constructed in such manner or surrounded by walls not less than 150 millimetres in height forming a well of such character that the inflammable liquid contained therein cannot escape therefrom;
  - (e) Low and high level means of ventilation shall be provided in the store;
  - (f) The openings shall be protected by non-corrodable wire gauze of not less than **0.9** millimetres;
  - (g) A store shall not be situated in such a position that it will impede the escape of any person from the premises, or endanger any room, building, or premises in the case of fire;
  - (h) Any store with a floor area in excess of 10 square metres shall be provided with at least two doors, constructed as described in paragraph (b) above;
  - (i) Every store shall be maintained at all times in accordance with the provisions of these specifications.
- 6.2.4 All lights installed shall be of incandescent electric type which shall be enclosed in an outer flame proof fitting and all wiring shall be armoured cable or enclosed in seamless metal tubes, the junctions of which are screwed together. All switches, junction boxes, fuses and other electrical equipment shall be outside the store. All armoured cables and seamless tubes shall be efficiently earthed.
- 6.2.5 No person shall use any store or cause or permit such store to be used, for any purpose other than the storage of inflammable liquid, oils and their containers, or engage in, or cause or permit any other person to be engaged in, any store unless all the doors of the store are fully open and kept entirely unobstructed.
- 6.2.6 No person shall enter any store or cause or permit any store to be entered without the express permission of the occupant or other responsible person in charge of such store.
- 6.2.7 For each store on the premises two 9 kg dry powder fire extinguishers and two 9 litres sand buckets shall be installed.
- 6.2.8 Prior to constructing the store the promoter shall have the plan of the store approved by the Mauritius Fire and Rescue Service after payment of a prescribed fee.

### 6.3 ***Carbide of Calcium***

#### *Storage/Retail of Carbide of Calcium*

- 6.3.1 If the quantity used or stored is less than 2.5 kg.  
The Calcium of carbide shall be kept in separate hermetically – closed vessels containing not more than half a kilogram each.

- 6.3.2 If the quantity used or stored does not exceed 14 kg.
- (a) The Carbide of Calcium shall be kept only in metal vessel or vessels hermetically – closed at all times when the carbide is not actually being placed in or withdrawn from such vessel or vessels.
  - (b) The vessels containing Carbide of Calcium shall be kept in a dry and well ventilated place away from any source of heat and away from other combustible materials.
  - (c) Precaution shall be taken to prevent unauthorised persons having access to the Carbide.
  - (d) Notice shall be given of such keeping to the Chief Fire Officer.
- 6.3.3 If the quantity used or stored exceeds 14 kg and is below 250 kg, the promoter shall adhere with the following precautions.
- (a) The Carbide of Calcium shall be in watertight and airtight metal containers of sufficient strength to permit handling without rupture.
  - (b) The vessels shall be hermetically-closed at all times when the Carbide is not actually being placed in or withdrawn from such vessel.
  - (c) The vessels containing Carbide of Calcium shall be kept in a dry well ventilated place away from any source of heat and away from other combustible materials.
  - (d) Precaution shall be taken to prevent unauthorised persons having access to the Carbide.
  - (e) Sign of ‘Carbide of Calcium’, ‘Dangerous if not kept dry’ in block letters of not less than 50 millimetres high and the following caution ‘The contents of this package are liable, if brought into contact with moisture, to give highly inflammable gas’ shall be displayed.
  - (f) The vessels containing Carbide of Calcium shall be kept above ground level on pallets and shall be well secured to prevent them from falling or being knocked over.
- 6.3.4 If the quantity used or stored exceeds 250 Kg, the promoter shall-
- (a) submit a plan showing the place where it is proposed to keep the substance, and the building and structures within 15 metres of such place to the Chief Fire officer. A sectional elevation of the storage place shall also be shown.
  - (b) The substance shall be kept in a store.
- 6.3.5 Construction of Store-
- (a) Every store shall be constructed of fire resisting material with the door opening outwards or of a sliding type, and so maintained as at all times to be free from water and shall have no cellar or basement beneath. The floor shall be raised above the surrounding ground level, or other suitable precautions taken to the approval, in writing, of the Chief Officer to prevent flood water coming into contact with the Carbide of Calcium.
  - (b) Adequate ventilation shall be provided at high and low levels in the storage place, and in any place in which Carbide of Calcium is used, and no vessels or other articles shall be so placed as to obstruct such ventilating apertures.
  - (c) Sign of “CARBIDE OF CALCIUM” in block letters of not less than 100 millimeters high shall be conspicuously displayed outside the storage area.

6.3.6 Means for fighting fire

	<b>Quantity</b>	<b>Types of Dry Powder Fire Extinguisher</b>
(a)	Exceeding 14 Kg but not exceeding 500 Kg	One 9 Kg
(b)	Exceeding 500 Kg but not exceeding 2500 Kg	Two 9 Kg
(c)	Exceeding 2500 Kg but not exceeding 5000 Kg	Three 9 Kg
(d)	Exceeding 5000 Kg but not exceeding 25000 Kg	Four 9 Kg
(e)	Exceeding 25000 Kg	One 50 Kg mounted on trolley

7. **HAZARDOUS MATERIAL**

7.1 ***Storage/retail of pesticides, insecticides, fungicides, fertilizers and other chemicals***

- (a) Promoter shall comply with the conditions of the 16<sup>th</sup> Schedule of the Dangerous Chemicals Control Act 2004.
- (b) Pesticides, insecticides, fungicides, fertilizers and other chemicals shall be stored on non-combustible racks and in sealed packs as received from distributors.
- (c) The different types of substances shall be physically separated from each other and inadvertent mixing shall be strictly avoided.
- (d) Care shall be taken to avoid spillage. Any small spill shall be immediately cleaned and the waste shall be carefully disposed of.
- (e) Storage site shall be provided with low and high ventilation at least on two opposite sites.
- (f) Electrical appliances used for this purpose shall be flame proof.
- (g) Sign of ‘DANGEROUS CHEMICALS’ in letters of not less than 100 millimetres shall be displayed on the storeroom.
- (h) “No Smoking” signs shall be conspicuously displayed.
- (i) No person shall use any store or cause or permit such store to be used, for any purpose other than the storage of chemicals.

8. **MISCELLANEOUS REQUIREMENTS**

8.1 ***Electrical Installation***

- 8.1.1 The design, construction, maintenance or alteration of installations shall be carried out by competent persons according to MS 63.
- 8.1.2 All electrical systems shall be constructed, installed, protected, maintained, inspected and tested, so as to minimise the risk of fire.
- 8.1.3 All electrical conductors shall be of sufficient size and current-carrying capacity for the purposes for which they are intended.
- 8.1.4 Every electrical joint and connection shall be of proper construction as regards conductance, insulation and mechanical strength.
- 8.1.5 Every installation and every circuit shall be protected by means of fuse, circuit breakers and earthing.

- 8.1.6 Every circuit shall be so arranged as to prevent the persistence of dangerous earth leakage currents.
- 8.1.7 Effective means, suitably placed for ready operations shall be provided to cut off the supply of electrical energy on any electrical equipment, in order to prevent or remove danger.
- 8.1.8 Every installation shall be divided into circuits as necessary to avoid danger in the event of a fault and facilitate safe operations, inspections, testing and maintenance.
- 8.1.9 Protective devices shall be arranged and identified so that the circuits protected are easily recognized.
- 8.1.10 Cables to be installed on walls shall incorporate a sheath suitably resistant to any mechanical damage likely to occur, or to be contained in a conduit system or other enclosure affording adequate protection against such damage.
- 8.1.11 All fixed luminaries and lamps shall be placed or guarded so as to prevent ignition of any material which in the conditions of use foreseen, are likely to be placed in proximity to the luminaries or lamps. Any shade or guard used for this purpose shall be suitable to withstand the heat from the luminaries or lamp.

## 8.2 ***Housekeeping***

- 8.2.1 Housekeeping in relation to fire safety is the day to day management of fire hazards to minimise the occurrence of fire.
- 8.2.2 A high standard of cleanliness shall be observed at the place of work.
- 8.2.3 Waste products shall be regularly collected and carefully disposed of. Weeds and dry grasses shall be removed.
- 8.2.4 Areas in and around the building shall be kept free from accumulated waste materials.
- 8.2.5 A 'No Smoking' policy shall be enforced and "No Smoking" signs shall be displayed.
- 8.2.6 Walls and fences shall always be kept in good condition.
- 8.2.7 When repair works are being carried out fire precautions shall be observed and fire protection measures maintained.

## 9 **FIRE PREVENTION**

- 9.1 Fire prevention principles and measures are aimed at avoiding the inception of a fire
- 9.2 They involve the control of fire hazards at the place of work and observance of basic rules to avoid ignition sources coming into contact with combustible materials.
- 9.3 Every promoter of a commercial sector shall ensure that his/her employees are aware of basic fire prevention measures and strictly observe the rules at the place of work.

- 9.4 The main causes of fire are-
- (a) faulty electrical equipment/installations;
  - (b) smoking materials;
  - (c) frictional, welding, cutting sparks, naked flames;
  - (d) spontaneous combustion;
  - (e) arson.
- 9.5 Fire prevention measures with regard to these causes of fire are as follows-
- (a) electrical installation – the measures are described at paragraph 7.1;
  - (b) smoking material – A ‘No Smoking’ policy shall be enforced at the place of work;
  - (c) waste disposal – the measures are described at paragraph 7.2;
  - (d) flammable products – the measures are explained at paragraph 6;
  - (e) arson – daily patrol shall be exercised and strict surveillance shall be enforced.

## 10. **FIRE PROCEDURE**

- 10.1 A fire procedure outlines the main features of a fire emergency response plan which the promoter in the commercial sector shall establish and implement.
- 10.2 The plan contains measures to prevent the occurrence of a fire, fire protection measures and the course of action to be taken in the event of a fire.
- 10.3 The requirements for fire protection have been highlighted in Section 2 to 7.
- 10.4 Fire preventive measures have been described in Section 8.
- 10.5 Actions to be taken in the event of a fire include the following-
- a) Raise the alarm – any one who discovers a fire shall immediately inform all his/her colleagues and neighbours who might be affected by the fire.
  - b) Call the Mauritius Fire and Rescue Service – Dial 115  
Give the Service precise information concerning the fire including-
    - a. Your name and telephone number
    - b. the exact location of building/site
    - c. the nature of the fire or whether persons are trapped
  - c) Attack the fire – Try to extinguish the fire with the available first aid fire fighting equipment provided **it is safe to do so.**
  - d) Evacuate the building –  
All persons not involved in fighting the fire shall leave the premises through the nearest exit
    - Close the door of the room involved in fire
    - Walk – DO NOT RUN
    - Do not use elevators, always use staircases
    - Assist the disabled and elderly to an area of refuge or other safe place or assembly point.
    - Do not go back to the building for any reason until advised to do so



- 10.6 The promoter shall designate responsible persons and assign to them specific task as to “who will do what” in the event of a fire.
- 10.7 The promoter shall ensure that the designated persons are trained in their specific task.
- 10.8 The promoter shall ensure that the action plan is implemented through a fire drill conducted at least twice a year and record kept.

## 11. **FIRE RISK ASSESSMENT**

11.1 Ensuring an assessment of the fire risks within one’s premises has been carried out is a key part of the ‘responsible persons’ role.

### 11.2 ***The 5 steps of a risk assessment***

11.2.1 The following is a summary of the 5 steps the promoter will need to go through to carry out a fire risk assessment within your premises.

11.2.2 Step 1 – Identify the fire hazards within your premises

The Promoter need to identify-

- (a) Sources of ignition such as naked flames, heaters or sparks.
- (b) Sources of fuel such as accumulated waste, display materials, textiles or overstocked products.
- (c) Sources of additional oxygen such as forced air circulation or medicinal or commercial oxygen
- (d) supplies.

11.2.3 Step 2 – Identify people at risk

The Promoter need to identify any people who may be especially at risk such as-

- (a) People working in close proximity to fire hazards.
- (b) People working alone or in isolated areas (such as roof spaces or storerooms)
- (c) Children or parents with babies
- (d) The elderly or inform and people who are disabled.

11.2.4 Step 3 – Evaluate, remove, reduce and protect from risk

Evaluate the level of risk in your premises. Action should be taken to reduce the level of hazards

- (a) Replace highly combustible materials with less combustible ones as far as practicable.
- (b) Ensure adequate separation between combustibles and ignition sources.
- (c) Operate a “safe smoking” policy.

11.2.5 Step 4 – Record, plan, instruct and train

In this step, the promoter shall record, plan, instruct, inform and train. The promoter will need to record the hazards and people you have identified as especially at risk in Step 1 and Step 2. The promoter should also record what the he did about it in Step 3. A simple plan can help him achieve this.

- 11.2.6 Step 5 – Review  
Every time there is a significant change to the level of risk in the premises the fire risk assessment shall be reviewed and updated.

## 12. **PETROL SERVICE STATION**

- 12.1 A person willing to invest or trade, retail petroleum product shall adhere with the following requirements:

### 12.2 ***Application for the approval of plan***

- (a) Every application for the approval of plan shall be made in writing to the Chief Fire Officer.
- (b) Prior to the construction the promoter shall have the plan approved by the Mauritius Fire and Rescue Service after payment of prescribe fee which is non-refundable in the event of the application being rejected or the approval of the Chief Fire Officer being considered null & void.\
- (c) The plan shall be drawn to scale and shall specify the premises including their elevation with regards to adjacent buildings or structure above or below the ground, the inside dimensions shown in figures of any room, building or structure or storage tank in which inflammable liquid is to be stored, used or handled and the material shown in writing with which such room building structure or storage tank is or is proposed to be constructed and Full particulars including position of pumps, storage link and pipelines.

### 12.3 ***Fire Equipment***

- (a) For each storage tank on the premises two 9 Kg Dry Powder fire extinguishers and two metal fire buckets of capacity 9 litres filled with dry sand shall be provided OR
- (b) Not more than three 9 Kg Dry Powder fire extinguishers and six fire buckets shall be required to be installed in any premises.
- (c) All fire fighting equipment installed in such premises shall be regularly inspected and tested once yearly. A record of such inspection and test shall be kept.

### 12.4 ***Storage Tanks, Pumps, Pipelines and Containers***

#### *Capacity if underground storage tanks*

The capacity of any storage tank, if not within a bulk depot or an aerodrome or landing ground used by aircraft, shall not exceed 13,500 litres.

### 12.5 ***Construction of tanks***

- 1. Every storage tank shall be constructed of iron, steel or other suitable metal plates of adequate strength and properly riveted and caulked, welded, brazed or otherwise secured by some equally satisfactory process.
- 2. The top and sides of such tank shall be supported and strengthened by such uprights, girders, angle irons and ties as, having regard to the capacity, shape and situation of the tank, may be necessary to render it sufficiently strong for the purposed to which it is being put.

3. Every opening in any underground storage tank other than a vent pipes shall be securely closed by an effective and properly secured cap, cover tap or valve.
4. All pipes other than a ventilating pipe connected to an underground storage tank shall be carried down to within 100 millimetres of the bottom of the tank.
5. Every above ground storage tank shall have an adequate system of ventilation so as to prevent excessive internal pressure.
6. Every storage tank shall be maintained at all times in accordance with the respective provisions of these guidelines.

#### 12.6 ***Installation of Storage Tanks***

Every underground storage tank shall-

- (a) be so installed that the top of the tank is not less than 620 millimetres below the surrounding ground level, or covered with not less than a 150 millimetres thick concrete mat, of earth or sand;
- (b) be set in firm foundations and wholly surrounded with soft earth or sand or encased in concrete;
- (c) with the exception of any opening to the manhole be covered with concrete adequately reinforced in all cases where vehicular traffic passes over such tank;
- (d) be situated within the building line of the premises;
- (e) where such tank is situated in or within 1.5 metres of any basement or cellar, be installed in a chamber of concrete not less than 150 millimetres thick or brick not less than 225 millimetres thick set in cement mortar with the space with the pit surrounding the tank completely filled with closely packed earth or sand.

#### 12.7 ***Ventilation of underground storage tanks***

Every underground storage tank shall have a ventilating pipe of not more than 50 millimetres nor less than 25 millimetres internal diameter, which pipe shall –

- (a) be carried up to a height of not less than 4 metres into the open air;
- (b) have the upper end protected with a non-corrodable wire gauze of not less than 0.9 millimetre thick secured in such a manner that such gauze may be removed for examination and cleaning;
- (c) terminate at least 7 metres away from any fire, flame or naked light or other agency likely to ignite inflammable liquid or its vapour.

#### 12.8 ***Abandoned tanks***

In the event of any underground storage tank being abandoned, the owner of such tank shall cause it to be removed or filled with sand, or liquid concrete, or water, as approved by the Chief Fire Officer

12.9 ***Position of pumps***

No pump or other device used or intended to be used for the issue or transfer of inflammable liquid to any vehicle shall be erected outside the building line of any premises or within 4 metres of any entrance, or exit of a building adjoining any public place:

- i. where such entrance or exit is set back from such public place the pump or device shall be erected not less than 4 m from such public place;
- ii. no such pump or device shall be erected in such a position that a hose can be used for the issue or transfer of inflammable liquid on or across any public place.

12.10 ***Pumps or ramps***

Pumps or other devices used or intended to be used for the issue of inflammable liquid to motor vehicles or containers shall not be erected on any ramp or within 4 metres of the beginning of the ramp.

12.11 ***Pump hoses***

Delivery of inflammable liquid from any pump to the fuel tank or any vehicle shall be made only through sound hose having an earthing wire in its construction efficiently attached to the metal of the pump and to the metal hose nozzle. Except at an aerodrome or landing ground used by aircraft no hose attached to any pump shall exceed 4.5 metres in length measured from the pump to the tip of the nozzle

12.12 ***Situation of filling pipes and pumps***

1. Every pump shall be –
  - a) at surface level;
  - b) installed in such position that it will not impede the escape of any person from the premises in case of fire;
  - c) so situated or protected by surrounding walls as not to expose adjoining property to the risk of danger from fire during any filling operations or otherwise.
2. The provisions laid down in sub-paragraphs (b) and (c) of the foregoing paragraph shall be applicable to every filling pipe inlet.

12.13 ***Naked lights and electric apparatus***

1. No person shall install or take or cause or permit to be installed or taken any fire, flame, naked light or other agency likely to ignite inflammable liquid or its vapour, except an incandescent electric light which shall be of flame-proof type, including the connecting cable, within 3 metres of any inflammable liquid pump.
2. No person shall place or cause or permit to be placed any electrical switch, fuse, motor or other such device within a distance of any pump unless such switch, fuse, motor or device including connecting cables is of flame-proof construction.
3. The electrical wiring between the distribution board or junction box and the pump shall be of flame-proof type and shall, where possible, be in one continuous length of wire: Provided that where this is not possible, flame-proof junction boxes shall be used.
4. The use of Cellular phone shall be prohibited.

12.14 ***Maintenance of tanks, pipe lines, pumps, etc***

1. All tanks, pipe lines, pumps, machinery, fittings and appurtenances for the storage, use or handling of inflammable liquid shall be –
  - a) of sound and proper construction;
  - b) so installed and fixed as not to be liable to be damaged;
  - c) efficiently electrically earthed;
  - d) free from leakage of inflammable liquids, and as far as is reasonably possible, free from leakage of inflammable liquid vapour, except by means of a vent pipe;
  - e) maintained in good and proper order and at all times in accordance with the provisions of these fire safety requirements.
2. All pipelines shall be below ground level.
3. All electrical earth connections required under this regulation shall be examined once every twelve months by a competent person who shall enter in a suitable log book supplied by the occupier of the premises and kept solely for that purpose, the efficiency and conditions of such earth, his name and address, and the date of the examination. All such entries shall be signed by such qualified person and shall be readily available for inspection by the Chief Fire Officer.

13. **PETROL SERVICE STATION RETAILING AUTOGAS AS FUEL**

13.1 These guidelines recommend basic safety requirements for the Storage and dispensing of L.P.G. as Automotive fuel at Petrol Filling Stations and conditions to be imposed.

13.2 These fire safety requirements cover the design, construction and use of L.P.G storage vessels and ancillary facilities as well as safe operations at such sites.

13.3 The use of alternative designs, materials and methods where these provide equivalent standard of safety may be accepted.

13.4 The installation for the storage and dispensing of L.P.G at Petrol Filling Station shall be approved by the Chief Fire Officer, Government Fire Services.

13.5 ***Layout, Location and Spacing of Storage Vessels.***

13.5.1 L.P.G storage vessels, pump bays, loading and discharge facilities shall be located and spaced to ensure:-

- (a) that they are sufficiently distanced from fixed sources of ignition.
- (b) that they provide access for firefighting and other emergency services.
- (c) that spillage from one vessel work area does not flow under any other vessel or directly to any other important facility / work area.

13.5.2 L.P.G vessels can be installed *aboveground* or *mounded* or *below ground*.

13.5.3 Ground beneath *aboveground* pressure storage vessels and in unfilled below ground chambers shall be either compacted or concreted and graded to levels so as to ensure that any spillage has a preferential flow away from the vessel and its connections.

- 13.5.4 Pits and depressions other than those which are provided as catchment areas shall be avoided in and close to the storage area.
- 13.5.5 No pressure vessel for L.P.G shall be located within the bunded enclosure of:  
 (a) a tank containing any flammable liquid  
 (b) a tank containing liquid oxygen or other hazardous or cryogenic substances.  
 (c) a tank containing refrigerated L.P.G or L.N.G.  
 (d) a heated storage tank.  
 L.P.G vessels shall not be installed under forecourt *driveways*.
- 13.5.6 When damage to L.P.G systems from vehicular traffic is a possibility, precautions to guard against such damage must be taken. E.g. use of crash barriers.
- 13.5.7 *Below ground* and *mounded* storage vessels shall be protected from above loadings due to vehicular traffic or other cause either by fencing off the area under which the storage is buried or by the use of re-inforced concrete slab adequate to prevent the weight imposing concentrated direct loads on the vessel.  
 The vessel manhole cover and other fittings shall be protected against damage and tampering. The perimeter of the area under which storage is buried shall be permanently marked.
- 13.5.8 *Below ground* and *mounded* storage vessel shall have a minimum cover of 500 mm
- 13.5.9 The area which includes storage vessels pumping equipment and loading / unloading facilities shall be enclosed by a commercial type fence at least 2 metre high unless otherwise adequately protected. Adequate ventilation shall be provided.
- 13.5.10 *Aboveground* vessels shall not be positioned under power cables. Distances from the vessel outline should not be less than 1.5 metre for power cables less than 1.0 KV and 10 metre for cables 1.0 KV above.
- 13.5.11 Separation Distances are established to ensure clearance from vessel and / or potential sources of ignition which, if these fire would pose a risk to the vessel or the associated equipment.
- 13.5.12 Separation distances from buildings, boundaries and fixed sources of ignition are shown in Table 1.

**Table 1 – Minimum separation distances for vessels up to and including 135cu metres.**

Vessel Water Capacity in Litres	Minimum separation distances (metres)				
	<i>Aboveground</i> vessels			Buried or <i>mounded</i> vessels	
	From boundaries; property lines, buildings, fixed sources of ignition	Between vessels		From boundaries; Property lines, buildings Fixed sources of ignition	Between vessels(2)
	With fire wall (4)		PRV or valve assembly	Vessel shell (1)	

<b>≤ 2500</b>	3.0	1.5	1.0 (3)	3.0	3.0	1.5
<b>&gt;2500 - ≤10000</b>	7.5	4.0	1.0 (3)	4.0	3.0	1.5
<b>&gt;10000-≤135000</b>	15.0	N/A	1.5 (3)	7.5	3.0	1.5

- 13.5.13 Where the target is a building or structure, the distance is to be measured to the edge of the foundation nearest to the vessel.
- 13.5.14 The distance between adjacent vessels must be sufficient to allow access to the shell for inspection / maintenance and to facilitate working with earth moving equipment, erecting scaffolding etc.
- 13.5.15  $\frac{1}{4}$  of the sum of the diameters of adjacent vessels with a minimum of the distance indicated.
- 13.5.16 The separation distance for vessels < 5000 litres water capacity may be reduced to those indicated if a suitable fire wall is constructed between the vessel and boundary or occupied buildings etc.
- 13.6 Separation distances between components is shown in Table 2.

**Table 2 – Minimum separation distance between facilities handling LPG and flammable liquids at automotive Retail sites.7**

	<b>LPG storage Vessel</b>	<b>Storage vessel Filling Connection</b>	<b>LPG pump</b>	<b>LPG dispenser</b>	<b>Motor vehicle LPG filling connection</b>
LPG storage vessel	-	N/A	Note 3	3 m	3 m
Storage vessel filing connection	Note 1	-	Note 2	3 m	3 m
LPG pump		Note 2	-	Note 3	Note 3
LPG dispenser	3 m	3 m	Note 3	-	N/A
Motor vehicle – LPG filling connection.	3 m	3 m	Note 3	N/A	-
Underground tank (flammable liquid) manhole or fill point	1.5 m Note 4	3 m	3 m	3 m	3 m
<i>Aboveground</i> storage tank/bund (flammable liquid) flash point <65degree Celsius	6 m Note 5	6 m Note 5	6 m Note 5	6 m	6 m

Vents–flammable liquids tanks horizontal distance	3 m	3 m	3 m	3 m	3 m
Forecourt pumps – flammable liquids	3 m	3 m	Note 3	Note 6	N/A
Parked motor vehicles	1.5 m with fire wall	3 m	1.5 m	1.5 m	1.5 m
Site boundary, buildings, fixed sources of ignition	Refer to table 1		4.5 m	4.25 m	4.25 m
LPG cylinder storage area	8 m	8 m	8 m	8 m	8 m

Note 1.

Filling may be by remote fill or via filler valve attached to LPG storage vessel.

Note 2.

Adequate space for safe access to fill connection to be provided

Note 3.

Pump to be protected by location or mechanical means from vehicle accident but not positioned under the vessel. Adequate space for maintenance to be provided around dispenser and pump.

Note 4.

The distance of 1.5 m applied to the distance between the LPG vessel and the underground flammable liquid tank. Any spillage of flammable liquid during filling of underground tank to be directed away from the LPG vessel.

Note 5.

Any spillage from flammable liquid tanks to be directed away from the LPG vessel and equipment. Pool fire from flammable liquids spillage shall not result in flame impingement on the LPG facility.

Note 6.

No separation distance is required between LPG dispensers and flame-proof liquid automotive fuel dispensers. Non flame – proof equipment must not be located within the hazard zone associated with LPG dispensers.

13.7 ***Storage Vessel.***

13.7.1 Vessels shall be designed, constructed, installed, inspected and tested in accordance with a recognized pressure vessel code as appropriate e.g. BS 5500, ASME section VIII.

13.7.2 Each vessel shall be provided with at least one of each the following fittings, all of which shall be suitable for use with LPG over the vessel’s design range of pressure and temperature.

- (a) pressure relief system connected directly to the vapour space.
- (b) manhole
- (c) drain system
- (d) means of determining the liquid level.
- (e) pressure indicator connected to the vapour space.
- (f) temperature indicator for contents.
- (g) maximum level device.



- 13.7.3 Connections shall be minimised, particularly those below the maximum liquid level.
- 13.7.4 Connections shall be designed and attached to the vessel in accordance with its design code, e.g. B.S 5500 or ASME section VIII. Connections shall preferably be welded and flanged but screwed connections smaller than 50 mm to BS 3799 or equivalent may be used.
- 13.7.5 The manhole shall be not less than 0.55 m internal diameter.
- 13.7.6 For below ground and mounded vessels, the manholes and connections shall be extended to suit the depth of cover i.e. to facilitate access to valves.
- 13.7.7 Consideration shall be given to providing two independent level gauges in addition to the maximum level device column type gauge glasses for determining liquid level are not acceptable.
- 13.7.8 The requirements for pressure relief as specified in the vessel's design code e.g BS 5500, ASME section VIII must be complied with.  
(a) Relief valves shall be spring loaded, weight relief valves should not be used.  
(b) Relief valves shall be constructed so that the breakage of any part will not obstruct the free discharge of vapour under pressure.
- 13.7.9 The pressure at which relief valves start to discharge and reach full flow should be in accordance with the vessel's design code e.g. BS 5500 or ASME section VIII.
- 13.7.10 Every relief valve shall incorporate permanent markings as follows:-  
(a) manufacturer's identification including name or symbol, catalogue or type number.  
(b) nominal inlet and outlet size.  
(c) start to discharge pressure.  
(d) certified capacity in defined terms.
- 13.7.11 Relief valves, discharging directly to the atmosphere shall be fitted with vent pipes, adequately supported and have at least 1.5 m above ground level.
- 13.7.12 All liquid and vapour connections on vessels with the exception of those for relief valves, plugged openings, and those where the connection through the tank shell is not greater than 1.4 mm diameter shall have shut – off valves. These valves shall be preferably of fire safe type as per B.S 5146, B.S 6683 or equivalent.
- 13.7.13 The shut – off valves shall be located as close to the vessel connection as practicable.
- 13.7.14 All liquid and vapour connections other than for relief valves level gauges and drainage connections which are larger than 3 mm for liquids and 8 mm for vapour shall have an emergency shut – off valve.
- 13.7.15 The maximum quantity of L.P.G which shall be filled into any vessel shall be such that the vessel will not become liquid full due to expansion of its contents with rise in temperature, that is the highest level which the contents will reach in operational service due to whatever cause, must never fill the vessel. The maximum safe filling level shall not exceed 90% of the vessel.

- 13.7.16 Insulation when provided on vessels shall-
- (a) withstand, together with its cladding direct impingement from those streams.
  - (b) be impervious to the ingress of water vapour and
  - (c) be sufficiently robust to ensure that minor mechanical damage will not destroy its vapour barrier.
- 13.7.17 Vessels and their supports should be treated externally to prevent corrosion.
- 13.7.18 *Belowground* or *mounded* vessels need special consideration for external protection (e.g. coating, cathodic protection) such protection must be adequate to resist corrosion from surrounding material.
- 13.7.19 The backfill or covering material which will be in contact with *belowground* or *mounded* vessels shall be clean and free from rocks or similar abrasive material. The backfill shall be carefully consolidated and the covering of *mounded* vessels prevented from migration. The minimum cover provided shall be 500 mm.
- 13.7.20 Each pressure vessel shall be conspicuously and permanently marked to include the following :-
- (a) the pressure vessel code to which it is designed and constructed.
  - (b) the manufacturer's name and serial number.
  - (c) the capacity in defined units.
  - (d) the maximum and minimum safe working pressure.
  - (e) the minimum safe working pressure.
  - (f) the date of original test, test pressure and symbol of testing authority and space for subsequent inspection / test marking.

### 13.8 **Piping, Valves and Fittings.**

- 13.8.1 Piping systems shall conform to the provision of a recognized piping code as appropriate – E.g. B.S 3351 or its equivalent.
- 13.8.2 The usual material for pipe work is seamless carbon steel pipe (e.g. BS 3601 or its equivalent) with suitable fitting.
- 13.8.3 Irrespective of the design code, minimum pipe thickness shall conform to the schedule thickness specified in BS 1600 or ANSI B 36.10 or its equivalent.
- 13.8.4 Joint on piping runs shall preferably be welded joints. Pipe joints of 50 mm nominal size and larger should be welded or flanged. Joints smaller than 50 mm nominal size may be screwed.
- 13.8.5 When installed underground only welded joints are permitted and the pipe work needs to be fully protected against corrosion.
- 13.8.6 The primary shut off valves shall be of fire - safe type and of steel or nodular iron to BS 2787 or its equivalent.
- 13.8.7 Steel flanges and flanged fittings shall be to BS 1560, or its equivalent standards.
- 13.8.8 Steel butt welding fittings, other than flanges shall be to BS 1640 or its equivalent standards.

- 13.8.9 Steel socket welding and screwed fittings and screwed couplings shall be to BS 3799 or its equivalent standard.
- 13.8.10 All pipe lines shall have adequate flexibility to accommodate settling of vessels or other equipments, thermal expansion and contraction or any other stresses which may occur in the pipe work system.
- 13.8.11 Bends or loops may be used to provide flexibility. Where these methods cannot be used, suitable expansion joints of the bellow type properly anchored may be used. Bellows shall be protected against torsional loads.
- 13.8.12 Piping should preferably be laid above ground and protected against both physical damage and corrosion. When piping must be buried it shall be protected against physical damage from superimposed loads and corrosion.
- 13.8.13 Any equipment or section of pipelines in which liquid may be trapped shall be protected against excessive pressure caused.
- 13.8.14 Pipeline insulation shall be in accordance with the requirements of BS 3351 or its equivalent.
- 13.8.15 Hose materials should be suitable for use with the grade and service condition applicable.
- 13.8.16 Hoses shall be designed to withstand a minimum bursting pressure of 4 times the maximum pressure they will carry in service.
- 13.8.17 Hoses shall be examined visually everyday if used continuously, and each time of use if used intermittently. They shall be replaced when they show signs of deterioration.
- 13.8.18 Hoses shall be tested periodically to their maximum working pressure and for electrical continuity.
- 13.9 ***Support for Vessels and Piping.***
- 13.9.1 The design of the support systems shall follow the requirements of the code to which the vessel is designed and constructed.
- 13.9.2 The spacing of individual supports shall depend on vessel stressing and foundation loading which should be related to ground conditions.
- 13.9.3 The design of support systems shall allow for movement of the vessel as a result of pressure and thermal effects.
- 13.9.4 The storage vessel shall be securely anchored and adequate pier height.
- 13.9.5 Vessel skirts shall be provided with both inspection openings and vents to prevent accumulation of vapour.
- 13.9.6 Vessel support shall be designed to prevent or to drain any accumulation of water.
- 13.9.7 Pipe supports shall be designed and spaced to suit the pipework configuration, the anchorage and friction forces involved.

- 13.9.8 Supports for *aboveground* storage and pipe work shall be 2 hours fire resisting.
- 13.10 ***Pump, Compressors and Meters***
- 13.10.1 The design, materials and construction of pumps (dispensers) shall be suitable for L.P.G under foreseen operating conditions.
- 13.10.2 Pumps may be placed adjacent to a petrol dispenser and shall be protected against physical damage.
- 13.10.3 When pumps operate in parallel, each pump suction and discharge line shall contain a block valve designed for at least the maximum pressure the pump can deliver.
- 13.10.4 The design materials and construction of compressors shall be suitable for L.P.G vapour under foreseen operating conditions.
- 13.10.5 Liquids lines of suitable size shall be equipped with a high level shut down device, a level indicator and a drain.
- 13.10.6 The design, material and construction of meters and their ancillaries shall be suitable for L.P.G under foreseen operating conditions.
- 13.10.7 Meters shall be protected by filters.
- 13.10.8 Transfer systems shall be designed to minimize the risk of operator errors. Equipment shall be clearly marked.
- 13.10.9 If automatic alarm devices are used to indicate approach to maximum permissible filling level or automatic shut off to prevent overfilling, then they shall be independent of, and not operated by the primary level gauge on the vessel.
- 13.10.10 Emergency shut off valves (automatic or remotely controlled shall be installed on the pipeline to prevent uncontrolled discharge in case of hose failure.
- 13.11 ***Road Loading / Unloading Facilities.***
- 13.11.1 The location of road loading / unloading facilities shall be separate from other traffic. These shall permit easy access and exit without the need of reversing. Kerbs or other suitable barriers shall be provided to protect product handling facilities.
- 13.11.2 Ground beneath loading / unloading facilities shall be either concreted or compacted and graded to levels to ensure that any spillage has a preferential flow away from the tanker and vessel.
- 13.11.3 Flexible connections articulated pipe connections or hose between the fixed loading / unloading facilities and the road tanker shall enable connection without undue strains on the fixed facilities or transport connections. Emergency shut off valves shall be installed.
- 13.11.4 Readily accessible means shall be provided to enable the operator to shut the flow of L.P.G in an emergency.

- 13.11.5 Safety systems shall be provided to prevent road movement disconnecting the filling hoses or articulated arms.
- 13.11.6 Non – combustible materials shall be used in the construction of loading / unloading structures.
- 13.11.7 Road loading / unloading facilities shall be electrically continuous with the rest of product system.
- 13.12 ***Electrical Installation.***
- 13.12.1 The standard of electrical equipment installation and maintenance at Petrol Filling Stations shall be equivalent to that specified in “BS 7117 – Fuel Dispenser”.
- 13.12.2 Emergency switches connected to the site main emergency shutdown system which will isolate the supply of L.P.G shall be provided as follows:-  
(a) at the control point in sales building.  
(b) incorporated at the site main exterior emergency exits.  
(c) In the L.P.G vessel compound adjacent to exits.
- 13.12.3 Emergency switches shall be clearly labelled.
- 13.12.4 ***Fire Protection Requirements.***
- 13.12.5 An emergency procedure / plan must be developed to handle emergencies arising from leakage, fire or any other circumstances which could give rise to such emergencies. Such a plan shall include necessary liaison with local emergency response authorities and describe in detail who will do what in an emergency.
- 13.12.6 Two 9 kg Dry powder fire extinguishers type.
- 13.12.7 The application of water to storage vessels may be any one of or a combination of hydrants, hoses, mobile equipments, fixed monitors as well as fixed water sprays.
- 13.12.8 The equipment at 9.3 shall be designed to permit the application of water at a rate equivalent to 7 litres per minute per square metres of above ground vessel surface area.
- 13.12.9 All aboveground storage shall be provided with fixed sprays system designed to ensure that a film of cooling water is applied to the whole surface of the vessel.
- 13.12.10 Hydrants where provided shall be spaced in such a way to cover the whole facility. Hydrant installation shall be in accordance with the requirements of BS 750 or its equivalent.
- 13.12.11 Sufficient length of fire hose shall be provided. The outlet of each line shall be equipped with a jet / fog nozzle.
- 13.12.12 Control of water to fixed installations shall be possible from outside the danger area.
- 13.12.13 An adequate communication / alarm system shall be provided. The system shall be regularly tested.
- 13.12.14 All fire fighting equipments shall be inspected and tested at regular intervals. These must be maintained in operational order at all material time.

13.12.15 Readily ignitable material shall not be allowed to accumulate and remain within 6 metres of any above ground vessel.

13.12.16 Chemicals which are potential source of fire danger shall not be used as weed killers.

13.13 ***Warning Signs / Notices***

13.13.1 “HIGHLY FLAMMABLE - LPG” signs in black marking on a yellow background and “ NO SMOKING” signs in white marking on a red background shall be displayed on storage vessel or on the compound in block letters of not less than 100 millimeters high.

13.13.2 Notices shall be displayed at the dispenser as follows-

<b>Liquefied Petroleum Gas</b>	- black marking on a yellow background
<b>Extremely Flammable</b>	- black marking on a yellow background
<b>Switch Off Engine</b>	- white marking on a blue background
<b>Apply Handbrake</b>	- white marking on a blue background
<b>No Smoking – No Naked lights</b>	- white marking on a red background
<b>Switch Off Mobile Phones</b>	- white marking on a red background

13.13.3 Notice shall be displayed at emergency Switch as follows-

**EMERGENCY**  
**L.P.G. PUMP – SWITCH OFF HERE** -black marking on a yellow background

13.14 ***Operations and Training.***

13.14.1 Only the person in charge of the service station shall authorise the use of any L.P.G dispenser.

13.14.2 Once authorised the operation of a dispenser shall be via a button on the dispenser which must be held in during operation of the pump. Releasing the button shall stop the flow of L.P.G.

13.14.3 L.P.G tanker delivery shall not be permitted at the same time as a Petrol tanker delivery.

13.14.4 All parts of the L.P.G. installation, particularly storage areas and filling / discharge points shall be kept clean, tidy and free from extraneous material.

13.14.5 A written emergency procedure shall be provided at the site and all staff fully trained in the dangers of L.P.G. and what action to take in the event of any emergency.

13.14.6 Training shall include how to find a vehicle and what to do if:

- (a) a customer drives away whilst still connected.
- (b) a customer arrives at the unit with a different fill coupling than the nozzle supplied.
- (c) excess loss of product on disconnection.
- (d) the dispenser is run into.
- (e) a user receives a cold burn.
- (f) There is a problem during the tanker delivery.

13.14.7 Plant personnel shall also be trained in the fundamentals of fire – control and first aid fire - fighting.

- 13.14.8 All personnel involved with the handling of L.P.G shall understand the characteristic of the product be instructed to observe the procedures according to the spheres of their responsibility for
- (a) purging and filling of systems.
  - (b) draining water in service.
  - (c) transfer operations.
  - (d) filling or discharging.
  - (e) emergency stoppage of operations.
- All operations shall be carried out ONLY when adequate daylight or artificial light is available.
- 13.15 ***Procedure for Approval.***
- 13.15.1 The promoter of such a project shall make a written application to the Chief Fire Officer, Mauritius Fire and Rescue Services for his approval of the project.
- 13.15.2 Together with his application, the promoter shall submit,
- (a) A preliminary report on assessment of the site suitability.
  - (b) Two sets of plans drawn to scale 1:100 showing details and location of the storage vessel, pipe work, valves, dispenser, sale buildings, site boundary.
  - (c) Two sets of plans showing details of fire protection system.
  - (d) The written emergency procedure.
  - (e) Compliance and test certificate from independent authorities for the essential components of the system.
  - (f) A fee as prescribed shall be applicable if the filling Station is less than 2000m<sup>2</sup> or if above 2000m<sup>2</sup> for the approval of the project.
- 13.15.3 Approval shall be conveyed on receipt of the above documents and compliance with these fire safety requirements.
- 13.15.4 On completion of the project, the installation shall be registered with the Mauritius Fire and Rescue Service.
- 13.15.5 A certificate of registration shall be issued by the Chief Fire officer, Mauritius Fire and Rescue Service on submission of the prescribed fee together with the commissioning certificates of the L.P.G and fire protection system as well as a certificate on the state of electrical installation from an electrical engineer.
- 13.15.6 Abbreviation and glossary of terms used.  
L.P.G - Liquefied Petroleum Gas  
B.S - Bristish Standard

14           **LEGISLATION / GOVERNMENT POLICY**

14.1       ***Fire Clearances/Fire Certificates are issued after compliance with fire safety requirements, for the purpose of the following enactments-***

- a) The Mauritius Fire and Rescue Service Act 2013
- b) The Occupational Safety and Health Regulations 2011 ( Employees Lodging Accommodation)
- c) The Local Government Act 2011 and subsequent amendments - 2016
- d) The Education Act 2000
- e) The Residential Care Home Act 2003 & The Residential Care Home Regulations 2005
- f) The Business Facilitation (Miscellaneous Provision) Act 2006.
- g) The Dangerous Chemicals Control Act 2004
- h) The Early Childhood Care and Education Authority Regulations 2011
- i) The Consumer protection Regulations 2007 ( Scrap Metal)
- j) The Film Act 2002 & Film Regulations 2009
- k) The Building Control Act 2012

14.2       ***Certificates of Registration are issued under the following enactments after compliance with fire safety requirements:***

- a) Inflammable Liquids and Substances Regulations - GN 179/53
- b) Calcium Carbide Regulations – GN 91/67
- c) Inflammable Gases Regulations - GN 32/62

14.3       ***Transport permit is issued under the Inflammable Gases Regulations GN 32/62***

14.4       ***Ex-post Control***

14.4.1      If a promoter runs his/her activity in an existing building it will be inspected to ensure compliance with fire safety requirements, **5 days** after the start of the business.

14.4.2      Any short coming noted will be notified to the promoter and the Chief Executive of the Local Authority for appropriate action.

14.4.3      If a promoter intends to construct a new building or cause extensive alterations to an existing building, it is mandatory that the promoter consults the Mauritius Fire and Rescue Service before starting construction.



14.4.4 For any additional clarifications the Mauritius Fire and Rescue Service will be most willing to assist.

Address your queries to the Chief Fire Officer:

Phone No.: 212-0214, 212-0215

Fax No.: 210-5915

E-mail: [mfrs\\_headoffice@govmu.org](mailto:mfrs_headoffice@govmu.org)

Postal Address: 14, Deschartres Street

Port-Louis

## ANNEX 1 - INSPECTION CHECK LIST

### **Occupancy**

- (a) For what purpose the building is used?
  - (i) the type of construction
  - (ii) dimension of building
  - (iii) access for fire appliances
- (b) The number of person involved?
- (c) Is there any hazardous material on the premises?
- (d) Is the method of storage or handling of hazardous material appropriate?
- (e) Are the electrical and gas installation appropriate?

### **Means of Escape**

- (a) Is the means of escape satisfactory?
- (b) Are there sufficient exit door/staircases?
- (c) Is the means of escape free from obstruction?
- (d) Is there sufficient lights/emergency light in the escape routes?
- (e) Can the escape routes be used safely?
- (f) Are there appropriate signs indicating the means of escape?

### **Means for fighting fires**

- (a) Is there provided appropriate type/numbers of portable fire extinguishers?
- (b) Is the fire extinguisher maintained/sited properly?
- (c) Is there any other first aid fire fighting equipments installed?
- (d) Is there the need for other first aid fire fighting equipment?
- (e) Is there any fixed fire protection equipment?
- (f) Are there the need for any fixed fire protection system?

### **Means for giving warning in case of fire**

- (a) Is there the need for fire warning system?
- (b) Is a fire warning system installed?
- (c) If installed, does it operate properly?

### **Staff Training**

- (a) Are the occupants familiar with the escape route?
- (b) Do they know the evacuation procedure?
- (c) Are the staffs conversant in handling first aid fire fighting equipment