ENQUIRY DRAFT

Specification for the Storage, handling, and transportation of LPG cylinders

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Guyana National Bureau of Standards

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Contents

Foreword

This Guyana Standard was revised by the **Technical Committee – Gas Cylinders** in 2025. In the formulation of this standard, assistance was derived from the following publications:

(a) LPG Road Transport Standard. Shell International Petroleum Company Limited. October 2002.

(b) The storage of LPG in cylinders and cartridges at distributors, dealers, retailers, etc. and at customers' premises.

This standard was developed to establish requirements for the safe use and storage of LPG Cylinders and is intended to be made compulsory.

Members of the Technical Committee (Gas Cylinders)

Specification for the Storage, handling, and transportation of LPG cylinders

1 Scope

This standard outlines the specifications for the storage, handling and transportation of portable containers used for the storage of Liquefied Petroleum Gases (LPG).

2 Definitions

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

2.1 liquefied petroleum gases (LPG)

Material composed primarily of the following hydrocarbons either by themselves or as mixtures: propane, butane, propylene and butylene.

2.2 container

Any vessel, including tanks and cylinders that are used for transporting or storing LPG.

2.3 cylinder

A portable container designed and constructed to contain LPG with a water capacity less than 454 kg.

3 Cylinder specifications

3.1 Containers specifications

Cylinders shall conform to the following specifications or any internationally recognised standards and be stamped to indicate such;

(a) DOT 4B-240;

(b) DOT 4BA-240;

(c) DOT 4BW-240; or

(d) DOT 4E-240;

In cases where the above specifications are not met, a working pressure of 16.56 kg/cm^2 (240 PSI) or more shall be clearly marked by the manufacturer on the cylinder.

3.2 Cylinder markings

Cylinders shall be properly marked with the following:

(a) Tare weight;

(b) Water capacity;

(c) Serial number;

(d) Manufacturer or trade name;

(e) Date of manufacture or last test date;

(f) Tester's symbol; and

(g) Cylinder specification or working pressure.

3.3 Connections and appurtenances

Cylinders shall be fitted with the following connections and appurtenances:

(a) Safety relief device that is designed to relieve vapour;

(b) Cylinder shroud, in good condition that is securely welded to the cylinder body, and protects the service valve. In the event that the cylinder is not fitted with a shroud, a neck ring should be fitted onto the cylinder to allow a valve protection cap to be screwed onto the cylinder; and

(c) Foot ring, in good condition that is securely welded to the cylinder body, enables the cylinder to stand in a stable, vertical position, and prevents contact between the cylinder bottom and the ground.

3.4 Cylinder body

The body of the cylinder shall be in good condition and the following shall apply:

(a) There are no sharp dents or cuts;

(b) No dents on welds;

(c) No evidence of exposure to fire or excessive heat;

(d) No bulging of cylinder;

(e) No corrosion pitting; and

(f) No general corrosion that could weaken the cylinder wall.

3.5 Cylinder repairs

Repairs or replacement of non-pressure parts of the cylinder such as the foot ring and neck ring shall be done only if welding or excess heat is not applied to the pressure bearing part of the cylinder. After repairs are completed, the cylinder shall be subjected to testing for requalification. Repairs or replacement of pressure bearing components of cylinders shall not be performed.

3.6 Cylinder requalification

Cylinders shall be requalified periodically according to the following intervals:

(a) Every 12 years after manufacture date, and then

(b) Every 12 if the previous requalification method used was the DOT water jacket type hydrostatic test; or

(c) Every 7 years if the previous requalification method used was the DOT simple hydrostatic test.

NOTE 1 All Cylinders must be subjected to a visual inspection before refilling.

3.6.1 Water jacket type hydrostatic test

A pressure of twice the marked service pressure is applied, using a water jacket so that the total expansion of the cylinder during the application of the test pressure can be observed and recorded for comparison with the permanent expansion of the cylinder after depressurisation. Cylinders that passed the retest are marked with the month and year (for example, 8-04 – August, 2006). Cylinders that leak or for which the permanent expansion exceeds 10% of the total expansion shall be rejected.

3.6.2 Simple hydrostatic test

Cylinders are filled with water and a pressure of twice the marked service pressure is applied. The cylinder is carefully observed while under test pressure for leaks, swelling or bulging indicating weakness. Cylinders that passed the test are marked with the month and year (see 3.6.1). Cylinders that leak, develop swelling, or bulging shall be rejected.

3.7 Storage location

Cylinders in storage shall be located in such a manner that exposure to corrosive substances or atmospheres, excessive temperature, tampering and physical damage are minimised. They shall be stored outdoors in a secure, well-ventilated environment from doorways or openings of buildings frequented by the public. Storage of LPG cylinders shall not be below ground level, that is, in pits or basements. Escape and access routes from the premises shall not be blocked or in any way obstructed. Cylinders shall not be stored with oxidisers.

3.8 Outdoor storage

Storage shall be in cages or cabinets that are robust and capable of supporting the full weight of the cylinders to be stored. They shall be of strong steel frame construction and provide adequate ventilation. The following requirements shall be observed:

(a) Cages shall be positioned safely in the open air on level ground in accordance with the separation distances in **Table 1**;

(b) If storage is in petrol stations, a separation distance of not less than 4m from petrol pumps, petrol tank manlids, vents etc. shall be observed;

(c) Cages shall be kept locked and under direct supervision in order to deny unauthorised access;

(d) Cages shall have the marking, "**Danger", "Highly Flammable LPG", "No Smoking" or "Open Flame"** and "**Emergency Procedures**";

(e) Cylinders shall be stored with their valves upright, and with the valves uppermost;

(f) Adequate provision shall be made to prevent vehicular impact with the cage; and

(g) All combustible materials shall be stored no less than 4m away from the cage.

3.9 Separation distances

Table 1 shows the horizontal distances away from the following areas that a quantity of LPG shall be stored:

(a) Line of adjoining building that may be or is built upon;

(b) Busy thoroughfares or sidewalks; and

(c) Line of adjoining property occupied by places of public gathering.

Table 1

TABLE SHOWING THE QUANTITIES OF LPG AND THE HORIZONTAL DISTANCES THEY CAN BE STORED

Quantity of LPG stored (kg)	Horizontal distance to a (m)	Horizontal distance to b and c (m)
0 to 325	0	0
326 to 1,135	0	3
1,136 to 2,725	3.	3
2,726 to 4,540	6	6
Over 4,540	8	8

NOTE 3 For the purpose of determining the quantity of LPG stored above, all cylinders shall be considered full regardless of the quantity actually in them.

3.10 Indoor storage

Where cylinders are stored inside buildings, no more than 27kg LPG shall be stored. If more than 27 kg are stored indoors, the building shall be constructed using a non-combustible material having a fire resistance of not less than 1 hour, and one of the following means of ventilation shall be used on the building:

(a) Mechanical ventilation that shall discharge air at a minimum rate of $0.3m^3$ per minute per square meter of floor area; or

(b) Where natural ventilation is used, permanent regularly spaced openings shall be provided at both high and low levels on the outside walls to ensure sufficient natural ventilation. These openings shall total at least 2.5% of the total roof and outside wall area.

Ventilation points shall be arranged to provide air movement as uniformly as possible, and shall be provided at ground level and at high points on the wall. Ventilation shall discharge to safe locations, which are within the separation distances specified in **Table 1**.

The following shall also apply for indoor storage:

(i) Storage shall be at the ground floor level with at least one side of the store as the building's external wall;

(ii) No more than 2000 kg of LPG, and no other flammable material shall be stored in this building;

(iii) Where the storage area is within a building, the internal walls separating the store from the rest of the building shall be of concrete construction;

(iv) Cylinders shall not be stored within an enclosed cupboard or cabinet within a building;

(v) LPG cylinders shall not be stored below ground level;

(vi) Escape exits shall be provided a clear distance of no more than 12 m from any part of the building to an escape exit;

(vii) All cylinders shall be stored upright with the pressure relief valve positioned in direct contact with the vapour space;

(viii) The requirements for fire extinguishers shall be observed and;

(ix) Storage area shall have the following markings: "**Danger", "Highly Flammable LPG", "No Smoking", "Open Flame"** and **"Emergency Procedures"**.

3.11 Cylinder stacking

Cylinders shall be stacked one on top of the other. The following shall be observed;

(a) The shrouds must be of sufficient diameter that the stack will be stable and of sufficient height that the cylinder valves will not be damaged;

(b) Thin pieces of wood may be used to separate the layers. These pieces of wood shall be flat and undamaged; and

(c) Cylinders of 20 kg and less shall be stacked no higher than three high. Cylinders ranging from 21kg and 35kg shall be stacked no more than two high. Cylinders greater than 35kg shall not be stacked more than one high.

3.12 Fire extinguishers

Storage locations shall be provided with the appropriate number of extinguishers for dealing with LPG fires according to the following volumes:

(a) less than 400 kg - One 9 kg BC extinguisher;

(b) 400 – 5,000 kg - Two 9 kg BC extinguishers; and

(c) Over 5,000 kg - Two 9 kg. BC extinguishers plus one extra for every additional 10,000 kg of LPG.

3.13 Cylinders for display

LPG cylinders that are stored for display, use and sale inside retail areas shall be subject to the following conditions:

(a) Cylinders larger than 25 kg capacity shall not be stored inside retail premises for display, use or sale; and

(b) Only gas free cylinders shall be stored in permanent window or other point of sale displays.

4 Handling

When handling LPG cylinders**,** care shall be exercised and the following shall be observed:

(a) Cylinders shall not be rolled on their sides but shall be either carried bodily, rolled on their foot rings or carried by properly designed mechanical handling equipment;

(b) Cylinders shall always be handled in a manner that minimises damage to valves, foot rings, shrouds and caps.

(c) **Cylinder filling:** LPG cylinders shall be filled only by the owners provided that the owners operate an authorised business. In circumstances where the owner of a cylinder does not operate authorised LPG business, a cylinder shall be filled by permission of the owner by an authorised LPG business only.

4 Transportation

In the process of transportation of cylinders, the following shall be observed:

(a) Vehicles shall not be loaded above the gross vehicle weight of the vehicle;

(b) Cylinders shall be determined leak free before loading them on vehicles;

(c) All cylinders greater than 4.5 kg LPG capacity shall be transported in an upright position, with the pressure relief device in direct contact with the vapour space of the cylinder;

(d) The cargo space in which the LPG is stored shall be isolated from the driver's compartment, the engine and the exhaust system;

(e) Cylinders shall be transported in open bodied vehicles. Small cylinders may be transported in passenger cars up to a limit of 25 kg. They shall be fastened securely in position to minimise the possibility of movement, tipping, or physical damage either to themselves or the supporting structure. The restraint used shall take into consideration movement that may arise from both braking and acceleration forces; and

(f) Cylinders shall be stacked safely. In addition to the requirements for cylinder stacking (above), the

following shall be observed:

(i) Stacking shall be done in such a manner that no more than ¼ of the height of the top layer of cylinders is higher than the height of the sides of the truck.

(ii) Persons shall not be allowed to travel within the cylinder containing structure of the vehicle;

(iii) Cylinders shall not be dropped or thrown onto or off the vehicles, or rolled horizontally along the ground, but trundled on the foot ring or moved in a properly designed wheelbarrow;

(iv) Vehicles transporting more than 225 kg LPG shall have a clearly visible sign that reads "**Danger", "Highly Flammable Gas"** or **"No Smoking"**; and

(v) Each vehicle shall be equipped with at least one approved portable fire extinguisher having a minimum capacity of 9 kg dry chemical with a B:C rating.

(vi) LPG cylinders shall not be transported with other types of compressed gases.

(vii) Cylinders shall not be transported via passenger aircraft. Air transportation may be allowed with approval and authorisation from the Guyana Civil Aviation Authority (GCAA).

Exception: The provisions of this section do not apply to the transportation of LPG on vehicles on which LPG is used as the fuel for its propulsion.

(g) Empty LPG cylinders shall be transported, stored and handled in the same manner as filled cylinders.

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