SRI LANKA STANDARD 1196: PART 7 : 2000
UDC 665.72

CODE OF PRACTICE FOR TRANSPORT,STORAGE AND HANDLING OF LPG

PART 7 : TRANSPORT OF LPG IN CYLINDERS BY ROAD, RAIL OR ON WATER

SRI LANKA STANDARDS INSTITUTION

CODE OF PRACTICE FOR TRANSPORT, STORAGE AND HANDLING OF LPG
PART 7 : TRANSPORT OF LPG IN CYLINDERS BY ROAD, RAIL OR ON WATER

SLS 1196 : Part 7 : 2000

Gr.4

SRI LANKA STANDARDS INSTITUTION
No. 17, Victoria Place,
Off Elvitigala Mawatha,
Colombo 08
SRI LANKA

Sri Lanka Standards are subject to periodical revision in order to accommodate the progress made by industry. Suggestions for improvement will be recorded and brought to the notice of the Committees to which the revisions are entrusted.

This standard does not purport to include all the necessary provisions of a contract.

CODE OF PRACTICE FOR TRANSPORT, STORAGE AND HANDLING OF LPG
PART 7 : TRANSPORT OF LPG IN CYLINDERS BY ROAD, RAIL OR ON WATER

FOREWORD

This standard was approved by the Sectoral Committee on Liquefied Petroleum Gas Industry and was authorized for adoption and publication as a Sri Lanka Standard by the Council, of the Sri Lanka Standards Institution on 2000-09-21.

The objective of this part of the Code of Practice is to set out the basic requirements for the safe carriage by road, rail or on water of LPG in cylinders particularly for the benefit of LPG suppliers, dealers, stockists, users and authorities.

The other parts of this Code of Practice are as follows:

Part 1 : General provisions
Part 2 : Design installation and maintenance of bulk LPG storage at fixed installation
Part 3 : LP Gas piping system - Design and installation
Part 4 : Safe filling of LP gas at depots
Part 5 : Storage of full and empty LPG cylinders and cartridges
Part 6 : Use of LP gas in cylinders at residential premises
Part 8 : Safe handling and transport of LPG in bulk by road

The Sri Lanka Standards Institution gratefully acknowledges the use of the following publications, in the preparation of this code:

a) **NFPA 58** - Standard for the Storage and Handling of Liquefied Petroleum Gases; Published by the National Fire Protection Association.
b) **Code of practice number 27** - Carriage by Road of LPG Cylinders in Closed Vans; published by the Liquefied Petroleum Gas Industry Technical Association (UK).
c) Shell Gas Company Instruction Sheets.

1 SCOPE

1.1 This part of the Code of Practice covers the safe carriage of LPG in cylinders by road, rail or on water.

1.2 This part of the code does not cover the transportation of LPG on vehicles or boats incidental to its use on these vehicles or boats.

NOTE

This code does not preclude the use of alternative designs, materials and methods where these could provide equivalent or better standard of safety as judged by a competent person.

2 REFERENCES

SLS 712	Liquefied petroleum gas
SLS 1177	Filling ratios and developed pressures for liquefiable and permanent gases
SLS 1178	Transportable welded steel gas containers of 0.5 *l* up to 150 *l* water capacity for liquefied petroleum gas
SLS 1184	Valve fittings for use with liquefied petroleum gas cylinders

3 DEFINITIONS

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

3.1 cylinder: A portable, refillable container for LPG of up to 150 litres water capacity.

3.2 cylinder valve: A device designed to release LPG for use from a cylinder when open and to ensure a leak free seal when closed.

3.3 LPG: Commercial butane and commercial propane to **SLS 712** and any mixtures thereof.

4 GENERAL SAFETY PRACTICES IN THE TRANSPORT OF LPG IN CYLINDERS

4.1 LPG in cylinders having an individual water capacity not exceeding 150 l shall be transported in accordance with the requirements of this code.

4.2 Cylinders to be filled with LPG shall be those manufactured in accordance with **SLS 1178**.

4.3 The quantity of LPG in cylinders shall be in accordance with **SLS 1177.**

4.4 Valves of cylinders shall be adequately protected against damage by a shroud or a valve cap.

4.5 The transport of full and empty cylinders in the distribution system, i.e. from the cylinder filling plant to the consumer, shall be by suitable means of transport, that are well ventilated, provide protection to the cylinders against accidental damage and where the cylinders can be restrained against movement during transit.

Cylinders empty of liquid LPG but containing vapour are classified as hazardous and shall be subject to the same overall safety considerations as full cylinders.

4.6 LPG cylinders must be handled with due care when loading/unloading using the mechanical handling equipment when available. Where cylinders are loaded/unloaded manually they should be carried or rolled on their base rings and never be thrown or dropped.

4.7 Damaged cylinders should not be delivered to consumers.

4.8 Cylinders shall always be conveyed with the valve uppermost to ensure that the safety relief valve is connected to the vapour space.

4.9 Cylinder markings and labels shall not be defaced or removed. Such action may render the carriage of cylinders by road , rail or on water illegal.

4.10 When loading or unloading cylinders, smoking or the presence of other sources of ignition shall be prohibited.

4.11 If a cylinder is suspected of leaking during carriage, the vehicle should be parked in a safe place, and the supplier contacted for advice, or such other safe action taken in accordance with agreed procedures.

4.12 In the event of an accident the emergency services should be informed that LPG cylinders are on board.

4.13 Observe Government Regulations in force covering the transport of LPG. i.e. Carriage of Dangerous Goods by Road, Rail or on water.

5 ROAD TRANSPORT OF LPG CYLINDERS

5.1 Distribution of LPG cylinders from filling plants and large volume deliveries between storage depots and dealers/ large volume consumers

5.1.1 Road vehicles used in cylinder distribution may be rigid, semi-trailer or draw-bar trailer configuration and shall comply with the following:

5.1.1.1 The engine shall be of the compression ignition type.

5.1.1.2 The cab of the vehicle shall be separated from the load compartment by the back of the cab.

5.1.1.3 The load compartment shall be open, preferably caged construction.

5.1.1.4 Means shall be provided to secure the load of cylinders while in transit.

5.1.1.5 Cylinders shall be loaded upright, with the valves in the vapour space.

5.1.1.6 A 2.5 kg dry powder fire extinguisher shall be installed in the cab and at least a 9 kg dry powder fire extinguisher fitted in an easily accessible position on the vehicle's chassis or body.

5.1.1.7 Where windows are fitted in the back of the cab, they should be of wired or laminated glass and not capable of being opened.

5.1.1.8 The vehicle's fuel tank should be protected from impact by mechanical means or by its location.

5.1.1.9 Cab heaters, other than those operated from the vehicle's engine shall not be installed.

5.1.1.10 The battery should be fitted with terminal guards and an easily accessible cut-off switch installed in the supply cable.

5.1.2 All vehicles entering the plant should be properly maintained and be in a safe condition to enter a hazardous area and undertake deliveries of LPG cylinders. Vehicles which clearly demonstrate faults which could prejudice the safety of the vehicle and its load should not be loaded, e.g. vehicles with excessively worn out tyres, unsafe wiring, leaky fuel tanks and damaged chassis/body. The distributor shall have appropriate check procedures in place to control the fitness of all vehicles engaged in the distribution of LPG cylinders.

5.1.3 Vehicles shall not be loaded in excess of their gross vehicle weight or the limit on individual axles.

5.1.4 All vehicles shall carry hazard warning signs as required by local regulations.

5.1.5 Motor cars shall not be permitted to enter filling plants for the purpose of loading LPG cylinders.

5.2 Distribution of LPG cylinders from dealers to domestic and small commercial consumers

5.2.1 Road vehicles used for distribution must be stable, robustly built providing some protection to the load in the event of an accident. Bicycles or motor bicycles are unsafe for transporting LPG cylinders.

5.2.2 The vehicles shall have an enclosed cab and a sound load carrying body with means for securing the cylinders during transit.

5.2.3 The vehicle body should preferably be open and naturally ventilated. However where protection against the weather is provided the body should still remain adequately ventilated. Closed vans shall not be used for the conveyance of more cylinders than is shown in the following table:

TABLE 1 - Cylinder carriage

Cylinder size (LPG content)	Maximum number of cylinders to carry
Larger than 20 kg	4
5 -20 kg	12
Less than 5 kg	25

5.2.4 Where more than four cylinders are to be carried in a closed van it shall conform with the following.

5.2.4.1 The load compartment shall have permanent ventilation openings at front and rear so as to ensure a flow of air through the load compartment. The rear openings shall be as low as possible to ensure the release of LPG vapour out of the vehicle. The total area of ventilation shall be equally divided between front and rear and shall not be less than 2 per cent of the load compartment floor area.

5.2.4.2 Cylinders carried in closed vans shall have gas-tight plugs or caps fitted to the valve outlets. Drivers shall carry sufficient spare plugs or caps for use on returned cylinders.

5.2.4.3 Cylinders shall not remain in closed vans while stationary for more than 2 hours.

5.2.5 The vehicles must be well maintained, have at least a 2.5 kg dry powder fire extinguisher available on the vehicle and carry appropriate hazard warning signs.

5.3 Operations

5.3.1 Drivers and their helpers should be given adequate training in the properties of LPG, the safe handling of LPG in cylinders, the removal of empty cylinders and safe connection of replacements, where appropriate, including all checks and tests that may be necessary, the use of safety equipment and dealing with emergencies.

5.3.2 Drivers and their helpers should be provided with hazard information in writing relevant to LPG in cylinders including a description of the product and the actions to be taken in the event of an emergency.

5.3.3 Before taking a vehicle on to the public road the driver should check the security of the load and the retention system. All loose cylinders shall be properly secured before driving away.

5.3.4 When loaded vehicles are left unattended in a public place the driver should, as far as possible, be within sight of the vehicle to prevent unauthorized access to the vehicle. When making a delivery the driver should park the vehicle so that it does not cause obstruction to the pedestrians and other road users. Drivers and other persons involved in handling cylinders shall not smoke or use matches or other similar sources of ignition at any time while involved in the loading, unloading or transport of LPG. Drivers should not attempt to carry out any electrical repair on vehicle while loading, unloading or transporting LPG.

5.3.5 When loading/unloading, cylinders shall always be handled with care using the equipment provided and never dropped or thrown on to hard surfaces. Those involved in the loading/unloading of cylinders shall wear safety boots with protected toe caps and suitable gloves.

6 RAIL TRANSPORT OF LPG CYLINDERS

6.1 When transported by rail cylinders shall preferably be carried in cages in naturally ventilated, open wagons. Cylinders shall be suitably restrained and not stacked above the height of the drop side in an open wagon unless carried in pallets, stillages or cages that effectively restrain the movement of cylinders.

6.2 Checks must be made to ensure that open wagons loaded with cylinders do not infringe on the railway department's loading gauge and that axle and gross weights are not exceeded.

6.3 LPG cylinders shall not be transported as mixed freight with other commodities.

6.4 Wagons loaded with cylinders shall carry the appropriate hazard warnings and written instructions for handling emergencies. Railway department personnel involved in LPG cylinder movements and in providing emergency services should be given adequate training in the properties of LPG, the safe handling of LPG in cylinders, the use of safety equipment and dealing with emergencies.

6.5 Locomotive units which are not approved for operating in Zone 2 areas shall not enter the classified hazard areas associated with filling plants and cylinder storage areas. Where necessary wagons containing LPG cylinders should be moved by other means or by coupling with neutral spacer wagons to ensure that hazard zones are respected. (For hazard area classification; see Table **1** in Appendix **A** of Part **4** of this Code of Practice.)

7 DISTRIBUTION OF LPG CYLINDERS ON WATER

7.1 The handling of LPG cylinders at marine and inland waterway berths shall comply with regulations set by the authority having jurisdiction over the movement of hazardous goods at harbours and inland waterways. The port or waterway authority responsible for the operation of the harbour or inland waterway should always be consulted for their advice and approval prior to setting up a distribution system that would involve the handling of LPG through their facilities.

7.2 The handling of LPG cylinders in harbours and berths shall be supervised by a competent person.

7.3 Vessels transporting LPG cylinders shall be appropriately classified by an internationally recognized marine surveyor, e.g. Lloyds, and comply with the requirements of the IMDG* code in respect to proper stowage and segregation of the cargo. It is the master's responsibility to ensure that LPG cylinders are properly stowed and segregated in accordance with the IMDG code.

---

* International Maritime Dangerous Goods code

7.4 The masters of vessels involved in the transport of LPG cylinders should be provided with product hazard information by the distributor responsible for the shipment, detailing procedures for entering enclosed compartments containing the cargo, handling leaks, problems related to inhalation and skin contact and dealing with fire.

7.5 Hazard zones should be established around areas designated for holding cylinders prior to loading and warning notices set out to prevent smoking and the introduction of other sources of ignition into the area.

7.6 LPG cylinders should preferably be securely stowed in suitable cage pallets and handled using pallet lifting gear. Cylinders when stowed, shall be suitably protected against physical damage from other cargo or equipment and not overstowed with other cargo.

7.7 LPG cylinders should preferably be transported as deck cargo in pallets securely stowed in a well ventilated area away from deck machinery and other equipment which could cause damage to the cylinders and are potential sources of ignition. Protection from the sea and weather should not restrict ventilation at low level around the pallet. Pallets should preferably be stowed only one tier high.

7.8 LPG cylinders may be stowed underdeck in compartments or holds capable of being ventilated and away from all sources of heat, accommodation and working crew.

7.9 LPG cylinders shall not be transported in enclosed shipping containers.

7.10 LPG cylinders shall be stowed upright with the valves in the vapour space.

8 TRAINING

8.1 Those concerned with the storage and handling of LPG in cylinders should be provided with adequate information, instructions, training and supervision appropriate to their responsibilities, both for their own safety and that of others in the vicinity who may be affected by the hazards of LPG. They should be familiar with the following:

a) the physical characteristics and hazards of LPG;
b) the fundamentals of fir-fighting and fire control, particularly fires involving LPG, and the effect that radiant heat or direct flame impingement can have on the safe containment of the product;
c) the correct handling of fire-fighting equipment and limitation s on its use as a first aid measure;
d) the inspection procedures to be adopted to allow removal of certain categories of cylinders, e.g. damaged or leaking or those cylinders requiring revalving or periodic inspection and testing;

e) the procedures for dealing with defective or leaking cylinders;
f) the procedures for deliberately venting LPG from a cylinder; and
g) the action to be taken in an emergency, including the responsibilities to be assumed, by whom, and the procedures for contact with local emergency services, etc.

8.2 All staff should receive initial and refresher training as appropriate. The emergency procedures should be practised at regular intervals to ensure everyone is familiar with the actions to be taken.

SLS CERTIFICATION MARK

The Sri Lanka Standards Institution is the owner of the registered certification mark shown below. Beneath the mark, the number of the Sri Lanka Standard relevant to the product is indicated. This mark may be used only by those who have obtained permits under the SLS certification marks scheme. The presence of this mark on or in relation to a product conveys the assurance that they have been produced to comply with the requirements of the relevant Sri Lanka Standard under a well designed system of quality control inspection and testing operated by the manufacturer and supervised by the SLSI *which includes surveillance inspection of the factory, testing of both factory and market samples.*

Further particulars of the terms and conditions of the permit may be obtained from the Sri *Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08.*

Printed at SLSI (Printing Unit)

SRI LANKA STANDARDS INSTITUTION

The Sri Lanka Standards Institution (SLSI) is the National Standards Organization of Sri Lanka established under the Sri Lanka Standards Institution Act No. 6 of 1984 which repealed and replaced the Bureau of Ceylon Standards Act No. 38 of 1964. The Institution functions under the Ministry of Science & Technology.

The principal objects of the Institution as set out in the Act are to prepare standards and promote their adoption, to provide facilities for examination and testing of products, to operate a Certification Marks Scheme, to certify the quality of products meant for local consumption or exports and to promote standardization and quality control by educational, consultancy and research activity.

The Institution is financed by Government grants, and by the income from the sale of its publications and other services offered for Industry and Business Sector. Financial and administrative control is vested in a Council appointed in accordance with the provisions of the Act.

The development and formulation of National Standards is carried out by Technical Experts and representatives of other interest groups, assisted by the permanent officers of the Institution. These Technical Committees are appointed under the purview of the Sectoral Committees which in turn are appointed by the Council. The Sectoral Committees give the final Technical approval for the Draft National Standards prior to the approval by the Council of the SLSI.

All members of the Technical and Sectoral Committees render their services in an honorary capacity. In this process the Institution endeavours to ensure adequate representation of all view points.

In the International field the Institution represents Sri Lanka in the International Organization for Standardization (ISO), and participates in such fields of standardization as are of special interest to Sri Lanka.

Printed at the Sri Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08.