Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

"ज्ञान का अधिकार, जीने का अधिकार"
Mazdoor Kisan Shakti Sangathan
"The Right to Information, The Right to Live"

"पुराने को छोड़ नये के तरफ"
Jawaharlal Nehru
"Step Out From the Old to the New"

Indian Standard

ROAD VEHICLES — LIQUEFIED PETROLEUM GAS (LPG) SPECIFIC EQUIPMENTS — DEFINITIONS, CLASSIFICATION AND GENERAL REQUIREMENTS

ICS 43.060.40
FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Automotive Vehicles Running on Non-conventional Energy Sources Sectional Committee had been approved by the Transport Engineering Division Council.

In the formulation of this standard, considerable assistance has been derived from ECE Regulation No. 67 (Revision 2 — Amendment 2 : Supplement 8 to the 01 series of amendments: Date of entry into force: 3 February 2008) ‘Uniform provisions concerning: Part 1 Approval of specific equipment of motor vehicles using liquefied petroleum gases in their propulsion system’.

Following documents may be referred to for latest update on statutory requirements related to use of LPG fuel system in internal combustion engine vehicles:

a) Central Motor Vehicle Rules, 1989 (CMVR) (As amended from time-to-time); and

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of test or analysis, shall be rounded off in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (revised)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.
Indian Standard
ROAD VEHICLES — LIQUEFIED PETROLEUM GAS (LPG) SPECIFIC EQUIPMENTS — DEFINITIONS, CLASSIFICATION AND GENERAL REQUIREMENTS

1 SCOPE
1.1 This standard specifies definitions, classification and general requirements of liquefied petroleum gas (LPG) specific equipments of motor vehicles of category L, M and N as defined in IS 14272 using LPG in their propulsion system.

1.2 This standard is applicable to LPG specific equipments intended to use on vehicles using liquefied petroleum gas, in accordance with Central Motor Vehicles Rules, 1989 (CMVR).

1.3 This standard is not applicable for the following:
   a) Fuel containers;
   b) Multi function valve assembly for permanently fixed liquefied petroleum gas (LPG) containers for automotive use; and
   c) LPG specific equipments used in agricultural tractors and construction equipment vehicles.

2 REFERENCES
The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<table>
<thead>
<tr>
<th>IS No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>14272:2011</td>
<td>Automotive vehicles — Types — Terminology (first revision)</td>
</tr>
<tr>
<td>15100:2001</td>
<td>Multifunction valve assembly for permanently fixed liquefied petroleum gas LPG containers for automotive use</td>
</tr>
</tbody>
</table>

3 DEFINITIONS
For the purpose of this standard, the following definitions shall apply.

3.1 Pressure — Relative pressure versus atmospheric pressure, unless otherwise stated.

3.1.1 Service Pressure — The settled pressure at a uniform gas temperature of 15°C.

3.1.2 Test Pressure — The pressure to which the component is subjected during the approval test.

3.1.3 Working Pressure — The maximum pressure to which the component is designed to be subjected and on the basis of which its strength is determined.

3.1.4 Operating Pressure — The pressure under normal operating conditions.

3.1.5 Maximum Operating Pressure — The maximum pressure in a component which might arise during operation.

3.1.6 Classification Pressure — The maximum allowable operating pressure in a component according to its classification.

3.2 LPG Specific Equipment — LPG specific equipment means,
   a) Container (see Gas Cylinder Rules, 2004);
   b) Accessories fitted to the container (see Gas Cylinder Rules, 2004);
   c) Vaporizer/pressure regulator;
   d) Shut-off valve;
   e) Gas injection device or injector or gas mixing piece;
   f) Gas dosage unit, either separate or combined with the gas injection device;
   g) Flexible hoses;
   h) Filling unit (see IS 15100);
   i) Non-return valve (see IS 15100);
   k) Gas-tube pressure relief valve;
   m) Filter unit;
   n) Pressure or temperature sensor;
   p) Fuel pump;
   q) Service coupling;
   r) Electronic control unit;
   s) Fuel rail; and
   t) Pressure relief device (see IS 15100).

3.3 Fuel Pump — A device to establish the supply of liquid LPG to the engine by increasing the pressure of the container with the fuel pump supply pressure.
3.4 Vapourizer — A device intended to vapourize LPG from a liquid to a gaseous state.

3.5 Pressure Regulator — A device intended for reducing and regulating the pressure of liquefied petroleum gas (LPG).

3.6 Shut-off Valve — A device to cut off the flow of LPG.

3.7 Gas-Tube Pressure Relief Valve — A device to prevent the pressure build up in the tubes above a pre-set value.

3.8 Gas Injection Device or Injector or Gas Mixing Piece — A device which establishes the liquid or vapourized LPG to enter the engine.

3.9 Gas Dosage Unit — A device which meters and/or distributes the gas flow to the engine and can be either combined with the gas injection device or separate.

3.10 Electronic Control Unit — A device which controls the LPG demand of the engine and cuts off automatically the power to the shut-off valves of the LPG system in case of a broken fuel supply pipe caused by an accident, or by stalling of the engine.

3.11 Pressure or Temperature Sensor — A device which measures pressure or temperature.

3.12 LPG Filter Unit — A device which filters the LPG, the filter can be integrated in other components.

3.13 Flexible Hoses — Hoses for conveying liquefied petroleum gas in either a liquid or vapour state at various pressures from one point to another.

3.14 Service Coupling — A coupling in the fuel line between the fuel container and the engine. If a monofuel vehicle is out of fuel the engine can be operated by means of a service fuel container which can be coupled to the service coupling.

3.15 Fuel Rail — A pipe or duct that connects the fuel injection devices.

3.16 Power Supply Bushing (for Fuel Pump/Actuator/Fuel Level Sensor) — A gas-tight, insulated, electrical power conductor for components installed inside the container.

4 CLASSIFICATION OF COMPONENTS

LPG components for use in vehicles shall be classified with regard to the maximum operating pressure and function shall be according to Fig. 1.

a) Class 1 — High pressure parts including tubes and fittings containing liquid or vapour LPG at vapour pressure or increased vapour pressure up to 3 000 kPa.

b) Class 1A — Components having maximum operating pressure up to 2 000 kPa.

c) Class 2 — Low pressure parts including tubes and fittings containing vapourized LPG with a maximum operating pressure below 450 kPa and over 20 kPa above atmospheric pressure.

d) Class 2A — Low pressure parts for a limited pressure range including tubes and fittings containing vapourized LPG with a maximum operating pressure below 120 kPa and over 20 kPa above atmospheric pressure.

e) Class 3 — Shut-off valves and pressure relief valves, when operating in the liquid or vapour phase.

f) Class 4 — Components having maximum operating pressure up to 20 kPa.

NOTE — A component can consist of several parts, each part classified in its own class with regard to maximum operating pressure and function.

5 GENERAL REQUIREMENTS

5.1 The specific equipment of vehicles using LPG in their propulsion system shall function in a correct and safe way.

5.2 The materials of the equipment which are in contact with LPG shall be compatible with it.

5.3 Those parts of equipment whose correct and safe functioning is liable to be influenced by LPG, high pressure or vibrations shall be subjected to relevant test procedures described in the relevant standards. In particular the provisions of relevant standards shall be fulfilled.
FIG. 1 CLASSIFICATION WITH REGARD TO MAXIMUM OPERATING PRESSURE AND FUNCTION
ANNEX A
(Foreword)

COMMITTEE COMPOSITION

Automotive Vehicles Running on Non-conventional Energy Sources Sectional Committee, TED 26

<table>
<thead>
<tr>
<th>Organization</th>
<th>Representative(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automotive Research Association of India, Pune</td>
<td>S HRI SHERIKANT R. MARATHE (Chairman)</td>
</tr>
</tbody>
</table>
| Ashok Leyland Ltd, Chennai | S HRI PRASSAN DESHPANDE  
S HRI S. ARUN (Alternate) |
| Automotive Research Association of India, Pune | S HRI M. K. CHOUDHARI  
Dr S. S. THIPSE (Alternate) |
| Bajaj Auto Ltd, Pune | S HRI T. M. BALARAMAN  
S HRI S. J. CHIPLONKAR (Alternate) |
| Batra Associates Limited, Faridabad | S HRI N. K. SAWHNEY |
| Bharat Heavy Electricals Ltd, Bangalore | S HRI J. B. D’SOUZA  
S HRI P. S. CHOPRA (Alternate) |
| Bharat Petroleum Corporation Ltd, Mumbai | S HRI R. N. DAS  
S HRI N. DASGUPTA (Alternate) |
| Bhiwadi Cylinders Pvt Ltd, New Delhi | S HRI MANVINDER SINGH  
S HRI RAINEESH CHOPRA (Alternate) |
| Bombay Environmental Action Group, Mumbai | S HRI DEBI GOENKA |
| Central Institute of Road Transport, Pune | S HRI S. A. SELVAKUMAR  
S HRI SHEEBA RANI (Alternate) |
| Central Pollution Control Board, Delhi | S HRI T. VENUGOPAL  
S HRI RAJESH DEBROY (Alternate) |
| Centre for Science and Environment, New Delhi | S HRI ANUMITA ROY  
S HRI CHIRAG SHAH (Alternate) |
| CLH Gaseous Fuel Applications (P) Ltd, Gurgaon | S HRI SHISHIR AGRAWAL  
S HRI GAGAN AGRAWAL (Alternate) |
| Delhi Transport Corporation, New Delhi | S HRI J. S. MALHOTRA |
| Force Motors (formerly Bajaj Tempo Ltd), Pune | S HRI S. B. PETHE  
S HRI S. V. VIDIHWANS (Alternate) |
| GAIL (India) Limited, New Delhi | S HRI S. P. SHARMA  
S HRI RANVEER SINGH (Alternate) |
| Gujarat Gas Company Limited, Surat | S HRI M. I. VAKHARWALA  
S HRI B. D. JOSHI (Alternate) |
| Hindustan Motors Ltd, Sagore | S HRI S. Y. RAO  
S HRI MANISH (Alternate) |
| Indian Auto LPG Coalition, Faridabad | S HRI SHISHIR AGRAWAL  
S HRI SUVASH GUPTA (Alternate) |
| Indian Institute of Petroleum, Dehradun | Dr MUKESH SAXENA  
S HRI A. K. AGRAI (Alternate) |
| Indraprastha Gas Ltd, New Delhi | S HRI ABHIJIT BHATTACHARYA |
| International Centre for Automotive Technology (ICAT), Gurgaon | S HRI U. K. BHAT  
S HRI S. K. KALIA (Alternate) |
| Mahanagar Gas Ltd, Mumbai | S HRI R. S. PRABHU  
S HRI A. UDAY KIRAN (Alternate) |
| Mahindra & Mahindra Ltd, Nasik | S HRI Z. A. MUGAWAR  
S HRI KIRAN MULKI (Alternate) |
Minda Auto Gas Limited, Gurgaon
Ministry of New and Renewable Energy, New Delhi
Petroleum and Explosives Safety Organization, Nagpur
Reliance Industries Limited, Navi Mumbai
Reva Electric Car Co (Pvt) Ltd, Bangalore
Ratu Autogas Pvt Ltd, Ahmedabad
Sagas Autotech Pvt Ltd, Mysore
Scooters India Ltd, Lucknow
Shri Shakti LPG Ltd, Hyderabad
Shrimankar Gas Car Services (P) Ltd, Mumbai
Society for Alternate Fuels Aftermarket Conversion, New Delhi
Society of Indian Automobile Manufacturers, New Delhi
Tata Motors Ltd, Pune
TVS Motor Company, Hosur
Vanaz Engineers Ltd, Pune
Vehicle Research & Development Establishment, Ahmednagar
In personal capacity (D-606, Vashi Plaza, Sector 17 Vashi, Navi Mumbai 400705)
In personal capacity (D-35, Hauz Khas, New Delhi 110016)
BIS Directorate General

Organization

Representative(s)

Shri K. V. V. Arjuna Rao
Shri Manu M. Murali (Alternate)
Director

Shri T. R. Thomas
Shri C. R. Suresh (Alternate)

Shri Vinay Kapadnis

Shri V. M. Suresh

Shri Rajesh Kothari

Shri Sanjeev K. P.
Shri Sanjay Shyamanur P. (Alternate)

Shri N. K. Trivedi
Shri B. K. Maitin (Alternate)

Shri Jaya Prakash Ramappa
Shri Chalapathy Rao (Alternate)

Shri Bimal Nataravala Shrimankar
Shri Rajesh Lalitbhai Dhruve (Alternate)

Shri Sanjay Gambhir
Shri R. P. Khurana (Alternate)

Shri K. K. Gandhi
Shri Atanu Ganguli (Alternate)

Shri P. K. Banerjee
Shri Amul Verma (Alternate)

Capt N. S. Mohan Ram

Shri S. R. Sarvate
Shri S. J. Vispute (Alternate)

Shri D. Radhakrishna
Shri G. B. Joshi (Alternate)

Shri Alok Chandra Gupta

Shri Balraj Bhawan

Shri T. V. Singh, Scientist ‘E’ and Head (TED)
[Representing Director General (Ex-officio)]

Member Secretary
Shri P. S. Mujral
Scientist ‘E’ (TED), BIS
Bureau of Indian Standards

BIS is a statutory institution established under the Bureau of Indian Standards Act, 1986 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publications), BIS.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of ‘BIS Catalogue’ and ‘Standards: Monthly Additions’.

This Indian Standard has been developed from Doc No. : TED 26 (732).

Amendments Issued Since Publication

<table>
<thead>
<tr>
<th>Amendment No.</th>
<th>Date of Issue</th>
<th>Text Affected</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

BUREAU OF INDIAN STANDARDS

Headquarters:
Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephone: 2323 0131, 2323 3375, 2323 9402  Website: www.bis.org.in

Regional Offices:

<table>
<thead>
<tr>
<th>Region</th>
<th>Office Details</th>
<th>Telephone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central</td>
<td>Manak Bhavan, 9 Bahadur Shah Zafar Marg</td>
<td>2323 7617</td>
</tr>
<tr>
<td></td>
<td>NEW DELHI 110002</td>
<td>2323 3841</td>
</tr>
<tr>
<td>Eastern</td>
<td>1/14, C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi</td>
<td>2337 8499, 2337 8561</td>
</tr>
<tr>
<td></td>
<td>KOLKATA 700054</td>
<td>2337 8626, 2337 9120</td>
</tr>
<tr>
<td>Northern</td>
<td>SCO 335-336, Sector 34-A, CHANDIGARH 160022</td>
<td>260 3843</td>
</tr>
<tr>
<td></td>
<td></td>
<td>260 9285</td>
</tr>
<tr>
<td>Southern</td>
<td>C.I.T. Campus, IV Cross Road, CHENNAI 600113</td>
<td>2254 1216, 2254 1442</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2254 2519, 2254 2315</td>
</tr>
<tr>
<td>Western</td>
<td>Manakalaya, E9 MIDC, Marol, Andheri (East)</td>
<td>2832 9295, 2832 7858</td>
</tr>
<tr>
<td></td>
<td>MUMBAI 400093</td>
<td>2832 7891, 2832 7892</td>
</tr>
</tbody>
</table>

Branches: AHMEDABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE. DEHRADUN. FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR. LUCKNOW. NAGPUR. PARWANOO. PATNA. PUNE. RAJKOT. THIRUVANATHAPURAM. VISAKHAPATNAM.

Published by BIS, New Delhi