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**Gas cylinders — Specifications and  
testing of LPG cylinder valves —  
Self-closing**

*Bouteilles à gaz — Spécifications et essais pour valves de bouteilles de  
GPL — Fermeture automatique*

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Reference number  
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Published in Switzerland

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 14245 was prepared by Technical Committee ISO/TC 58, *Gas cylinders*, Subcommittee SC 2, *Cylinder fittings*.

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## Introduction

This International Standard calls for the use of substances and procedures that can be injurious to health if adequate precautions are not taken. It refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage.

It has been assumed in the drafting of this International Standard that execution of its provisions is entrusted to appropriately qualified and experienced people.

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# Gas cylinders — Specifications and testing of LPG cylinder valves — Self-closing

## 1 Scope

This International Standard specifies the requirements for design, specification and type testing for dedicated LPG self-closing cylinder valves specifically for use with transportable refillable LPG cylinders from 0,5 l up to 150 l water capacity. It includes references to associated equipment for vapour or liquid service.

NOTE Annex B gives recommendations for production testing and inspection.

This International Standard does not apply to fixed automotive installations.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 10920, *Gas cylinders — 25E taper thread for connection of valves to gas cylinders — Specification*

ISO 11114-1, *Transportable gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 1: Metallic materials*

ISO 11114-2, *Transportable gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 2: Non-metallic materials*

ISO 11116-1, *Gas cylinders — 17E taper thread for connection of valves to gas cylinders — Part 1: Specifications*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

### 3.1

#### **liquefied petroleum gas LPG**

mixture of predominantly butane or propane with traces of other hydrocarbon gases classified in accordance with UN number 1965, hydrocarbon gas mixture, liquefied, or NOS or UN number 1075, petroleum gases, liquefied

NOTE In some countries, UN number 1011 and UN number 1978 may also be used to designate LPG.

[ISO 10464]

**3.2**

**cylinder valve**

valve designed for use in one or more of the following applications: liquid filling, liquid service, vapour service, liquid level indication

**3.3**

**external tightness**

resistance to leakage through the valve body to or from the atmosphere, when the valve is open

**3.4**

**internal tightness**

resistance to leakage across the valve seat, or other internal sealing components, when the valve is closed

**3.5**

**eduction tube**

tube fitted to the valve to allow withdrawal of liquid LPG with the cylinder in its normal operating position

**3.6**

**fixed liquid level gauge**

control device, such as a dip tube in combination with a vent valve, to verify that the predetermined maximum liquid level in a cylinder has been reached or surpassed

**3.7**

**liquid level indicator**

control device, such as a float gauge, permitting the gauging of the liquid level in the cylinder

**3.8**

**valve body**

major valve component including valve stem and/or valve outlet and, where applicable, the provision for other optional components

**3.9**

**excess flow device**

**flow limiter**

device designed to close or partially close when the flow of liquid or vapour passing through it exceeds a predetermined value and to re-open when the pressure differential across the valve has been restored below a certain value

**3.10**

**non-return valve**

valve designed to close automatically to restrict reverse flow

**3.11**

**vapour/liquid dual valve**

valve designed to allow vapour and liquid withdrawal from a cylinder in its normal operating position

**3.12**

**sealing element**

element used to provide internal leak tightness

**3.13**

**valve stem**

section of the valve body which connects to the cylinder

**3.14**

**valve outlet**

section of the valve body to which a regulator or connector can be fitted for vapour or liquid withdrawal

NOTE The valve outlet is also normally used for filling the cylinder.



**3.15****type test**

test or series of tests conducted to prove that the design meets the requirements of this International Standard

**3.16****cylinder opening**

part of the cylinder to which the valve stem connects

**3.17****quick coupling connector**

system which enables an appliance or equipment to be connected to a cylinder valve without the use of tools

**3.18****test pressure**

pressure at which the valve or component is tested in bar gauge

**3.19****sediment tube**

device designed to reduce the risk of foreign matter, which can be in the cylinder, from entering the valve

**3.20****protection cap/dust cap**

device fitted to the valve outlet and intended for one or more of the following functions:

- to protect the outlet;
- to prevent the ingress of foreign matter;
- to indicate unauthorized manipulation

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**3.21****sealing cap**

device fitted to, or integral with, the outlet of the cylinder valve to provide secondary closure

**3.22****valve operating mechanism**

mechanism that opens the valve when, or after, a regulator or connector is fitted and closes automatically when, or before, a regulator or connector is disconnected

**3.23****sealing mechanism**

mechanism to obtain internal leak tightness

**3.24****protection cap**

device that may be screwed to a fitting permanently attached to the cylinder to protect a cylinder valve

**3.25****shroud/guard**

device that may be welded to the cylinder to protect a cylinder valve

**3.26****gross mass**

mass of the heaviest cylinder on which the valve is intended to be fitted, including any permanently attached accessories and the maximum mass of the LPG content

### 3.27

#### **pressure relief valve**

valve which automatically, without the assistance of any energy other than that of the fluid concerned, discharges a quantity of fluid so as to prevent a predetermined safe pressure being exceeded, and which is designed to re-close and prevent the further flow of fluid after normal pressure conditions of service have been restored

NOTE The loading due to the fluid pressure underneath the valve-sealing element is opposed by a spring.

## **4 Design and specification**

### **4.1 General**

The valve shall be capable of withstanding:

- operating pressures and test pressures;
- mechanical stresses, including dynamic loads such as pressure shocks or cyclic changes;
- operating temperatures.

NOTE Pressures are gauge pressure unless otherwise specified.

There shall be valve external and internal leak tightness for the full range of pressure and temperature conditions.

The specific requirements relating to the functions, mechanical strength, pressure, operating temperatures, external and internal leak tightness of the valve and its components are detailed in the following subclauses of this clause and/or in the relevant test in Clause 5.

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### **4.2 Materials**

#### **4.2.1 General**

Materials in contact with LPG shall be physically and chemically compatible with LPG under all operating conditions for which the valve is designed (see ISO 11114-1 and ISO 11114-2).

In selecting an appropriate material for valve components, it is important to select not only for adequate strength in service, but also to give consideration to other modes of failure due to atmospheric corrosion, brass dezincification, stress corrosion, shock loads, and material failure.

#### **4.2.2 Operating temperatures**

Materials used shall be suitable for the temperatures for which the valve is designed.

The minimum operating temperature, to which the valve is expected to be exposed during normal use, is minus 20 °C. In service, temperatures below this may be encountered during short periods, e.g. during filling. Where necessary, e.g. in some countries and for certain applications, lower minimum operating temperatures shall be used. When equipment is designed for a temperature of minus 40 °C, it shall also meet the requirements of Annex C.

The maximum operating temperature to which the valve is expected to be exposed during normal operation is 65 °C. In service, this temperature may be exceeded for short periods.

### 4.2.3 Copper alloys

Valve bodies made from copper alloys shall be manufactured from materials in accordance with recognized standards, for example EN 12164 and EN 12165 or from alloys of equivalent properties.

### 4.2.4 Non-metallic materials

Non-metallic materials in contact with LPG shall be compatible with LPG (see ISO 11114-2). They shall not distort, harden or adhere to the body or seat face to such an extent as to impair the function of the valve.

In accordance with national or international standards, for example EN 549, non-metallic materials in contact with LPG shall meet the requirements for resistance to:

- gas (pentane test);
- lubricants;
- ageing;
- low temperature;
- high temperature;
- compression;
- ozone (where the material is exposed to the atmosphere).

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## 4.3 Essential components

### 4.3.1 Valve operating mechanism

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The valve shall be designed in such a way that the travel distance of the valve operating mechanism cannot be modified.

The valve operating mechanism shall be designed in such a way that it remains captive and achieves direct contact with the valve body in the absence of the sealing element, in order to limit the leakage rate of gas.

### 4.3.2 Valve body

If the valve body is made of more than one part, precautions shall be taken to ensure that there can be no unintentional dismantling. Dismantling shall require specialized equipment.

### 4.3.3 Sealing mechanism

The sealing mechanism shall ensure internal leak tightness. This can be achieved with one or more sealing elements, one of which shall be spring loaded to ensure closure when the valve is not activated.

The valve sealing system may also include a sealing cap.

### 4.3.4 Valve stem

The connection between the valve and the LPG cylinder shall be a threaded sealing system in accordance with ISO 10920, ISO 11116-1 or any other connection system that provides an equivalent level of safety.

The design of the valve stem shall prevent leakage, loosening in service and meet the requirements of 5.7.