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Gas cylinders — Self-closing cylinder valves — Specification and type testing

Bouteilles à gaz — Robinets de bouteilles équipés de clapets auto-obturants — Spécifications et essais de type

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

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

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Introduction

This document covers the function of a self-closing cylinder valve as a closure (defined by the UN Model Regulations). Additional features of self-closing cylinder valves (e.g. pressure relief devices) might be covered by other standards and/or regulations.

Self-closing cylinder valves conforming to this document can be expected to perform satisfactorily under normal service conditions.

This document pays particular attention to:

a) suitability of materials;

b) safety (mechanical strength, impact strength, endurance, leak tightness, resistance to ignition, resistance to acetylene flashback);

c) testing;

d) marking;

e) manufacturing tests and examinations.

In this document, the unit bar is used due to its universal use in the field of technical gases. It should, however, be noted that bar is not an SI unit, and that the corresponding SI unit for pressure is Pa (1 bar = 10^5 Pa = 10^5 N/m^2).

Pressure values in this document are given as gauge pressure (pressure exceeding atmospheric pressure) unless noted otherwise.

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Gas cylinders — Self-closing cylinder valves — Specification and type testing

1 Scope

This document specifies the design, type testing, marking and manufacturing tests and examinations requirements for self-closing cylinder valves intended to be fitted to refillable transportable gas cylinders which convey compressed, liquefied or dissolved gases.

NOTE 1 The main applications for such self-closing cylinder valves are in the calibration gas and beverage industries.

This document covers the function of a self-closing cylinder valve as a closure.

NOTE 2 Requirements for standard cylinder valves are given in ISO 10297. Requirements for quick-release cylinder valves are given in ISO 17871.

This document is not applicable to self-closing cylinder valves for cryogenic equipment, for portable fire extinguishers, or for liquefied petroleum gas (LPG).

NOTE 3 Requirements for valves for cryogenic vessels are specified in ISO 21011 and at a regional level, for example, in EN 1626. Requirements for valves for portable fire extinguishers at a regional level are specified, for example, in EN 3 series. Requirements for self-closing LPG cylinder valves are specified in ISO 14245.

NOTE 4 Additional requirements for pressure-relief devices might be specified in international/regional regulations/standards.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 10286, *Gas cylinders — Terminology*

ISO 10297:2014, *Gas cylinders — Cylinder valves — Specification and type testing*

ISO 10524-3, *Pressure regulators for use with medical gases — Part 3: Pressure regulators integrated with cylinder valves*

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

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

ISO 13341, *Gas cylinders — Fitting of valves to gas cylinders*

ISO 14246, *Gas cylinders — Cylinder valves — Manufacturing tests and examinations*

ISO 22435, *Gas cylinders — Cylinder valves with integrated pressure regulators — Specification and type testing*

3 Terms and definitions

For the purposes of this document, the terms and definitions in ISO 10286 and the following apply.

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ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
self-closing cylinder valve
cylinder valve with a normally closed *valve operating mechanism* (3.2) that is actuated by a separate *operating device* (3.3) which is not an integral part of the cylinder valve

3.2
valve operating mechanism
mechanism which opens the valve orifice by an *operating device* (3.3) and closes automatically when or before the operating device is disconnected and which includes the internal sealing system

3.3
operating device
external component which actuates the *valve operating mechanism* (3.2)

EXAMPLE Push-pin as part of a regulator, lever-operated push-pin.

3.4
external leak tightness
leak tightness to atmosphere when the valve is open

Note 1 to entry: Some designs of self-closing valves cannot leak externally except through the outlet connection.

3.5
internal leak tightness
leak tightness to atmosphere when the valve is closed and pressurized from the inlet

3.6
valve working pressure
p_w
settled pressure of a compressed gas at a uniform reference temperature of 15 °C in a full gas cylinder for which the valve is intended

Note 1 to entry: This definition does not apply to liquefied gases (e.g. carbon dioxide) or dissolved gases (e.g. acetylene).

Note 2 to entry: The valve working pressure is expressed in bar.

3.7
valve burst test pressure
p_{vbt}
minimum pressure applied to a valve during hydraulic burst pressure test

Note 1 to entry: The valve burst test pressure is expressed in bar.

3.8
valve test pressure
p_{vt}
minimum pressure applied to a valve during testing

Note 1 to entry: The valve test pressure is expressed in bar.

3.9
total package mass
combined mass of a gas cylinder, its valve(s), its permanent attachment(s) and its maximum allowed gas content

Note 1 to entry: Valve guards but not valve protection caps are examples of permanent attachments.

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Note 2 to entry: The total package mass is expressed in kg.

3.10
valve inlet connection
connection on the valve which connects the valve to the cylinder

3.11
valve outlet connection
connection on the valve used to discharge the cylinder

Note 1 to entry: For most valves, this connection is also used for filling the cylinder.

3.12
valve filling connection
connection on the valve used to fill the cylinder

Note 1 to entry: For some valves, the valve filling connection is different from the valve outlet connection.

3.13
normal temperature and pressure
NTP
temperature of 20,0 °C (293,15 K) and pressure of 1,013 bar absolute (0,101 3 MPa absolute)

4 Valve description

4.1 A self-closing valve typically comprises a:

a) valve body;

b) valve operating mechanism;

c) valve outlet connection(s);

d) valve inlet connection.

4.2 Valves can also include:

a) a pressure-relief device;

NOTE Some transport regulations require or forbid pressure relief devices for some gases, gas mixtures or gas groups.

b) a dip tube;

c) an outlet connection plug/cap;

d) an excess flow device;

e) a flow restricting orifice;

f) a filter(s).

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