



SLOVENSKI STANDARD
oSIST prEN ISO 23826:2021

01-marec-2021

Plinske jeklenke - Krogelni ventili - Specifikacija in preskušanje (ISO/DIS 23826:2021)

Gas cylinders - Ball valves - Specification and testing (ISO/DIS 23826:2021)

Gasflaschen - Kugelhähne - Spezifikation und Prüfungen (ISO/DIS 23826:2021)

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Gas cylinders — Ball valves — Specification and testing

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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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation of 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 www.iso.org/iso/foreword.html.

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

This is the first edition.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

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

Ball valves complying with this document can be expected to perform satisfactorily under normal service conditions.

This document pays particular attention to:

- a) safety (mechanical strength, impact strength, endurance, leak tightness, resistance to acetylene decomposition);
- b) suitability of materials;
- c) testing;
- d) marking.

This document has been written so that it is suitable to be referenced on the UN Model Regulations [1]. 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 ($1 \text{ bar} = 10^5 \text{ Pa} = 10^5 \text{ N/m}^2$).

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

Any tolerances given in this document include measurement uncertainties.

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Gas cylinders — Ball valves — Specification and testing

1 Scope

This document specifies design, type testing, marking and manufacturing test and examination requirements for ball valves used as:

- a) closures of refillable transportable gas cylinders, pressure drums and tubes;
- b) main valves for cylinder bundles;
- c) valves for cargo transport units (e.g. trailers, battery vehicles and MEGCs);

which convey compressed gases, liquefied gases and dissolved gases.

NOTE 1 In the course of the document, the term “valve” is used with the meaning of “ball valve”.

This document does not apply to ball valves for:

- oxidizing gases as defined in ISO 10156,
- toxic gases (i.e. gases listed in ISO 10298 having an LC₅₀ value $\leq 5\,000$ ppm) and
- acetylene for single gas cylinders, pressure drums and tubes.

NOTE 2 The reason for the exclusion of oxidizing gases is that the use of ball valves as closures of high pressure cylinders for oxidizing gases is known to lead to specific ignition hazards that cannot reasonably be mitigated through the ball valve design or type testing. Safety hazards concern both the ball valve itself and any downstream equipment.

NOTE 3 The reason for the exclusion of acetylene for single gas cylinders, pressure drums and tubes is that the risk of an acetylene decomposition cannot reasonably be mitigated through the ball valve design or type testing.

This document does not apply to ball valves for liquefied petroleum gas (LPG), cryogenic equipment, portable fire extinguishers and cylinders for breathing apparatus.

NOTE 4 Requirements for valves for cryogenic vessels are specified in ISO 21011 and at a regional level, e.g. in EN 1626. Requirements for valves for portable fire extinguishers at a regional level are specified e.g. in EN 3 series.

NOTE 5 Certain specific requirements for quick-release valves for fixed fire-fighting systems in addition to those that are given in this document are specified in ISO 16003 and at a regional level e.g. in EN 12094-4.

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 148-1, *Metallic materials — Charpy pendulum impact test — Part 1: Test method*

ISO 10156, *Gas cylinders — Gases and gas mixtures — Determination of fire potential and oxidizing ability for the selection of cylinder valve outlets*

ISO 10286, *Gas cylinders — Terminology*

ISO 10298, *Gas cylinders — Gases and gas mixtures — Determination of toxicity for the selection of cylinder valve outlets*

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

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

ISO 15615:2013, *Gas welding equipment — Acetylene manifold systems for welding, cutting and allied processes — Safety requirements in high-pressure devices*

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 given in ISO 10286 and the following apply.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1 ball valve

valve which uses the rotation of a ball with a through-passage to allow or shut-off flow through it

Note 1 to entry: Ball valves can have multiple ports.
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3.2 main valve

valve which is fitted to a cylinder bundle's manifold isolating it from the main connection(s)

3.3 valve operating mechanism

<ball valves> mechanism which rotates the ball and which includes external sealing systems and can include the internal sealing systems

3.4 valve operating device

component which actuates the *valve operating mechanism* (3.3)

Note 1 to entry: Examples are handle/lever, handwheel/knob, key or actuator.

3.5 stop mechanism

system which limits the position of the *valve operating mechanism* (3.3)

Note 1 to entry: Examples are stop pin and stop plate, mechanical stop in valve body and counterpart in handle/lever.

3.6 external leak tightness

leak tightness to atmosphere (leakage in and/or leakage out) when the valve is open

3.7 internal leak tightness

leak tightness across the seat (leakage in and/or leakage out) when the valve is closed

3.8 valve working pressure

p_w

settled pressure of a compressed gas at a uniform reference temperature of 15 °C in a full pressure receptacle 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.

3.9 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.

3.10 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.

3.11 lowest operating pressure

<ball valve> lowest settled pressure of the gas(es) for which the ball valve is designed

3.12 endurance torque

T_e

torque used during the endurance test

Note 1 to entry: The endurance torque is expressed in Nm.

3.13 over torque

T_o

torque applied to the *valve operating device* (3.4) in opening and closing direction which the *valve operating mechanism* (3.3) and/or *stop mechanism* (3.5) can tolerate and remain operable

Note 1 to entry: The over torque is expressed in Nm.

3.14 failure torque

T_f

opening or closing torque (whichever is the lower value) applied to the *valve operating device* (3.4) at which mechanical failure occurs

Note 1 to entry: The failure torque is expressed in Nm.

3.15 valve inlet connection

connection on the valve which connects the valve to the pressure receptacle

3.16 valve outlet connection

connection on the valve used to discharge the pressure receptacle

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

ISO/DIS 23826:2021(E)**3.17****valve filling connection**

connection on the valve used to fill the pressure receptacle

Note 1 to entry: The valve filling connection can be different from the valve outlet connection.

3.18**NTP**

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

4 Valve description

4.1 A ball valve (see [Figure 1](#)) typically comprises of:

- a) valve body;
- b) valve operating mechanism;
- c) valve operating device;
- d) stop mechanism;
- e) means to ensure internal leak tightness;
- f) means to ensure external leak tightness;
- g) valve outlet connection(s);
- h) valve inlet connection.

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4.2 Ball valves can also include:

- a) pressure-relief device;

NOTE 1 The relevant transport regulation can require or forbid pressure relief devices for some gases, gas mixtures or gas groups. Additional requirements for pressure-relief devices can exist in international/regional regulations/standards.

- b) dip tube;
- c) connection plug/cap;
- d) excess flow device;
- e) non-return valve on the valve filling connection;
- f) residual pressure device with or without non-return function;

NOTE 2 Requirements for residual pressure devices are given in ISO 15996.

- g) pressure regulating device;

NOTE 3 Requirements for pressure regulating devices are given in ISO 22435 for industrial applications and in ISO 10524-3 for medical applications.

- h) separate valve filling connection;
- i) flow restricting orifice;
- j) filter(s).

Not all of these components have test requirements detailed in this document.