



**SLOVENSKI STANDARD**  
**oSIST prEN ISO 10297:2023**  
**01-april-2023**

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**Plinske jeklenke - Ventili za jeklenke - Specifikacija in preskus tipa (ISO/DIS 10297:2023)**

Gas cylinders - Cylinder valves - Specification and type testing (ISO/DIS 10297:2023)

Gasflaschen - Flaschenventile - Spezifikation und Baumusterprüfungen (ISO/DIS 10297:2023)

Bouteilles à gaz - Robinets de bouteilles - Spécifications et essais de type (ISO/DIS 10297:2023)

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**Ta slovenski standard je istoveten z: prEN ISO 10297<sup>3</sup>**

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**ICS:**

23.020.35	Plinske jeklenke	Gas cylinders
23.060.40	Tlačni regulatorji	Pressure regulators

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**en,fr,de**



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## Gas cylinders — Cylinder valves — Specification and type testing

ICS: 23.020.35; 23.060.40

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# Contents

	Page
<b>Foreword</b> .....	<b>v</b>
<b>Introduction</b> .....	<b>vii</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>2</b>
<b>3 Terms and definitions</b> .....	<b>2</b>
<b>4 Valve description</b> .....	<b>9</b>
<b>5 Valve design requirements</b> .....	<b>16</b>
5.1 General.....	16
5.2 Materials.....	16
5.3 Valve connections.....	17
5.4 Mechanical strength.....	18
5.4.1 Resistance to hydraulic pressure.....	18
5.4.2 Resistance to mechanical impact.....	18
5.4.3 Resistance to valve stem impact.....	19
5.5 Valve operating mechanism.....	19
5.5.1 Opening and closing of the valve.....	19
5.5.2 Endurance.....	19
5.5.3 Resistance to overtorquing.....	20
5.5.4 Acetylene specific requirements.....	22
5.6 Valve operating device.....	22
5.6.1 Closing direction.....	22
5.6.2 Handwheel diameter.....	23
5.6.3 Exposure to flame.....	23
5.7 Leakage.....	23
5.8 Resistance to ignition.....	24
5.9 Flow capacity.....	24
<b>6 Type testing</b> .....	<b>25</b>
6.1 General.....	25
6.2 Test schedule.....	25
6.3 Documentation.....	28
6.4 Test samples.....	28
6.5 Test report.....	29
6.6 Test temperatures.....	29
6.7 Test pressures.....	29
6.7.1 Valve hydraulic test pressure.....	29
6.7.2 Valve test pressure.....	29
6.8 Test gases.....	30
6.8.1 Gas quality.....	30
6.8.2 Leak tightness tests.....	31
6.8.3 Endurance tests.....	31
6.8.4 Acetylene decomposition test.....	31
6.8.5 Oxygen pressure surge test.....	31
6.9 Hydraulic pressure test.....	31
6.10 Flame impingement test.....	32
6.11 Excessive torque tests.....	32
6.11.1 Handwheel operated valves.....	32
6.11.2 Key and toggle operated valves.....	32
6.11.3 VIPR type B and VIPR type C with the flow selector acting as the primary valve operating mechanism.....	32
6.12 Leak tightness tests.....	33
6.12.1 General.....	33
6.12.2 Internal leak tightness test.....	33

## ISO/DIS 10297:2023(E)

6.12.3	External leak tightness test.....	34
6.13	Endurance test.....	35
6.14	Endurance test of VIPR types B and C.....	36
6.15	Endurance test of the filling connection non-return valve.....	37
6.16	Visual examination.....	38
<b>7</b>	<b>Marking.....</b>	<b>38</b>
<b>Annex A</b>	<b>(normative) Impact test.....</b>	<b>40</b>
<b>Annex B</b>	<b>(normative) Tests for acetylene valves.....</b>	<b>42</b>
<b>Annex C</b>	<b>(normative) Oxygen pressure surge test.....</b>	<b>44</b>
<b>Annex D</b>	<b>(informative) Example of a vacuum test.....</b>	<b>49</b>
<b>Annex E</b>	<b>(normative) Endurance test machine.....</b>	<b>50</b>
<b>Annex F</b>	<b>(normative) Required tests for validation of changes and/or material variants within a valve design.....</b>	<b>52</b>
<b>Bibliography</b>	<b>.....</b>	<b>56</b>

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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](http://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](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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](http://www.iso.org/iso/foreword.html).

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

This fourth edition cancels and replaces the third edition (ISO 10297:2014+Amd1:2017), which has been technically revised.

The main changes are as follows:

- clarification of the scope concerning different VIPR designs,
- addition of several new terms and definitions, e.g. VIPR types A, B and C for easy referencing of different design types,
- oxygen pressure surge test:
  - for VIPR transferred from ISO 22435 and amended,
  - for RPV transferred from ISO 15996 and amended,
  - reference for test equipment and procedure to ISO 11114-6,
- endurance test for specific VIPR designs transferred from ISO 22435 and amended,
- endurance test of the non-return valve transferred from ISO 22435 and amended,
- acetylene decomposition test of VIPR designs transferred from ISO 22435 and amended,
- [clause 5.3](#) "Dimensions" removed,
- introduction of [Table 2](#) for giving the different leakage rates depending on the valve design,
- [Table 4](#) (former [Table 3](#)) amended,

**ISO/DIS 10297:2023(E)**

- introduction of recommendations for flow capacity values and reference to CGA V-9 for the respective determination as an example,
- introduction of a valve stem impact test for pin-index valves not permanently protected during transport and use and reference to CGA V-9 for the respective test,
- introduction of hydraulic pressure test also in closed position for manually operated valves,
- [Annex D](#) "example of test schedule" removed,
- information on changes and/or material variants within a valve design moved to new [Annex F](#) and amended.

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](http://www.iso.org/members.html).

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## Introduction

This document covers the function of a cylinder valve as a closure (defined by the UN Model Regulations). It is possible that additional features of cylinder valves (e.g. pressure regulating functions, residual pressure devices, non-return devices and pressure relief devices) are covered by other standards or regulations.

Cylinder valves conforming to 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 ignition, 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 in the UN Model Regulations.

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 — Cylinder valves — Specification and type testing

## 1 Scope

This document specifies design, type testing and marking requirements for:

- a) cylinder valves intended to be fitted to refillable transportable gas cylinders;
- b) main valves (excluding ball valves) for bundles of cylinders;
- c) cylinder valves or main valves with integrated pressure regulator (VIPR);

NOTE 1 This includes the following specific VIPR designs where:

- 1) the pressure regulating system of a VIPR is acting as the primary valve operating mechanism (VIPR type B). This also includes designs where closure of the primary valve operating mechanism of a VIPR is obtained by closing the seat of the pressure regulating mechanism.;
- 2) the primary valve operating mechanism of a VIPR is located at the low pressure side of the pressure regulating system (VIPR type C).

- d) valves for pressure drums and tubes;

which convey compressed, liquefied or dissolved gases.

NOTE 2 Where there is no risk of ambiguity, cylinder valves, main valves, VIPR and valves for pressure drums and tubes are addressed with the collective term “valves” within this document.

NOTE 3 The term “pressure receptacle” is used within this document to cover instances where no differentiation is necessary between gas cylinders, bundles of cylinders, pressure drums and tubes.

This document does not apply to

- valves for cryogenic equipment, portable fire extinguishers and liquefied petroleum gas (LPG);
- quick-release cylinder valves (e.g. for fire-extinguishing, explosion protection and rescue applications) - requirements for quick-release cylinder valves are specified in ISO 17871 which nevertheless contains normative references to this document;
- self-closing cylinder valves or ball valves.

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 LPG valves are specified in ISO 14245 or ISO 15995. Requirements for self-closing cylinder valves are specified in ISO 17879. Requirements for ball valves are specified in ISO 23826. Requirements for valves for portable fire extinguishers at a regional level are specified e.g. in EN 3 series.

This document only covers the function of a valve as a closure. Other functions that are possibly integrated in the valve can be covered by other standards. Such standards do however not constitute requirements according to this document.

NOTE 5 Definition and specific requirements for VIPR in addition to those that are given in this document are specified in ISO 22435 for industrial applications or ISO 10524-3 for medical applications. Similarly, certain specific requirements for residual pressure valves (RPV) with or without a non-return function in addition to those that are given in this document are given in ISO 15996.

## ISO/DIS 10297:2023(E)

NOTE 6 Certain specific requirements for valves for breathing apparatus in addition to those that are given in this document are specified at a regional level, e.g. in EN 144 series. 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.

NOTE 7 Additional requirements for pressure-relief devices can exist in international/regional regulations/standards.

NOTE 8 Requirements for manufacturing tests and examinations of valves covered by this document are given in ISO 14246.

## 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 10286, *Gas cylinders — Vocabulary*

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 11114-6, *Gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 6: Oxygen pressure surge testing*

ISO 11117, *Gas cylinders — Valve protection caps and guards — Design, construction and tests*

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

ISO/DIS 15615:2020, *Gas welding equipment — Acetylene manifold systems for welding, cutting and allied processes — Safety requirements in high-pressure devices*

## 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 terminology databases for use in standardization at the following addresses:

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

### 3.1 valve design

classification of valves with regard to the *valve operating mechanism* (3.10)

### 3.2 main valve

valve which is fitted to the manifold of a bundle of cylinders, battery vehicle, battery wagon or MEGC isolating it from the main connection(s)

### 3.3 residual pressure valve RPV

valve which incorporates a *residual pressure device* (3.4)

Note 1 to entry: The term “valve” covers the valves listed in [Clause 1, a\)](#) to d).

### 3.4 residual pressure device RPD

device that is designed to prevent ingress of contaminants by maintaining a positive pressure within the pressure receptacle relative to atmosphere by closing off its internal gas passages in the discharging direction

Note 1 to entry: This definition can be different to definitions given in applicable transport regulations.

### 3.5 valve with integrated pressure regulator VIPR

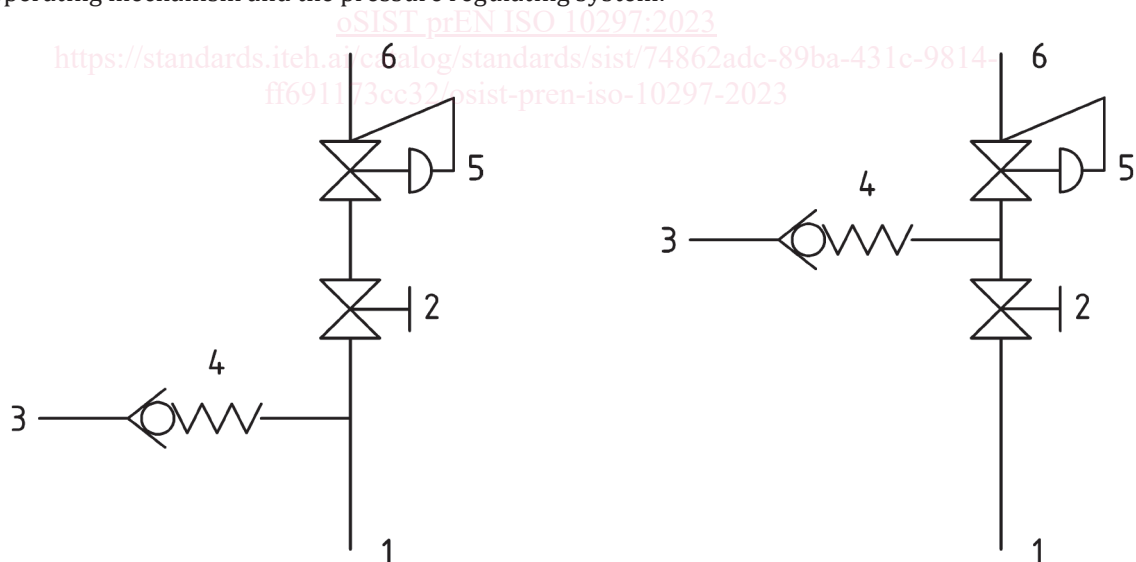
device intended to be permanently fitted to a pressure receptacle which comprises of at least a shut-off function and pressure regulating system

Note 1 to entry: VIPR used as a *main valve* (3.2) are covered by this definition.

### 3.6 VIPR type A

VIPR design where the *primary valve operating mechanism* (3.10) is located upstream of the *pressure regulating system* (3.9)

Note 1 to entry: For typical designs see [Figure 1](#). The filling connection can also be located between the primary valve operating mechanism and the pressure regulating system.



a) Filling connection upstream of the primary valve operating mechanism

b) Filling connection between the primary valve operating mechanism and the pressure regulating system

#### Key

- |   |                                   |   |                                   |
|---|-----------------------------------|---|-----------------------------------|
| 1 | valve inlet connection            | 4 | filling connection closing device |
| 2 | primary valve operating mechanism | 5 | pressure regulating system        |
| 3 | valve filling connection          | 6 | valve outlet connection           |

Figure 1 — VIPR type A designs

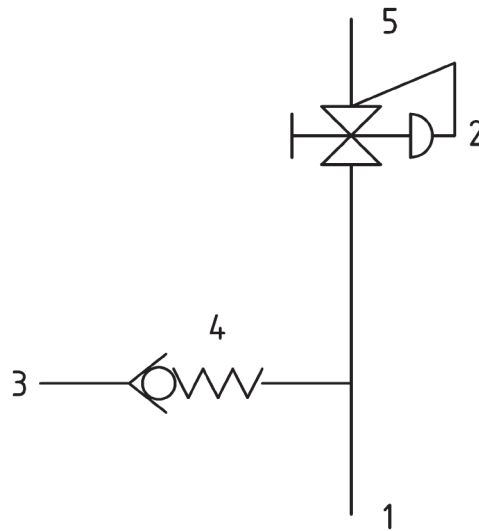
## ISO/DIS 10297:2023(E)

## 3.7

**VIPR type B**

VIPR design where the *pressure regulating system* (3.9) is also acting as the *primary valve operating mechanism* (3.10)

Note 1 to entry: See [Figure 2](#).

**Key**

- |   |  |   |                                   |
|---|--|---|-----------------------------------|
| 1 | valve inlet connection   | 4 | filling connection closing device |
| 2 | pressure regulating system including primary valve operating mechanism | 5 | valve outlet connection           |
| 3 | valve filling connection   |   |                                   |

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<https://standards.iteh.ai/standards/iso/10297/2023/431c-9814-ff691173cc32/osist-pren-iso-10297-2023> **Figure 2 — General structure of a VIPR type B design**

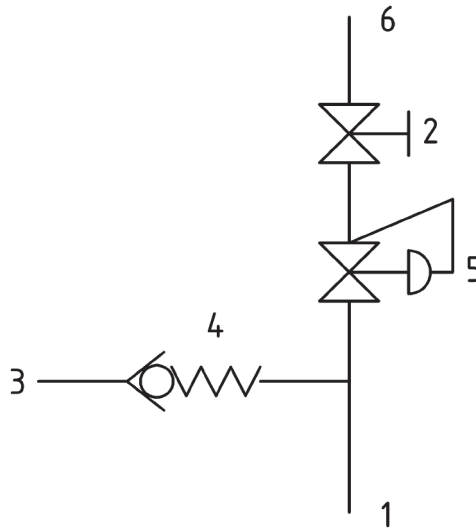
## 3.8

**VIPR type C**

VIPR design where the *primary valve operating mechanism* (3.10) is located downstream of the *pressure regulating system* (3.9)

Note 1 to entry: The primary valve operating mechanism can be a flow selector.

Note 2 to entry: See [Figure 3](#).

**Key**

- |   |                                   |   |                                   |
|---|-----------------------------------|---|-----------------------------------|
| 1 | valve inlet connection            | 4 | filling connection closing device |
| 2 | primary valve operating mechanism | 5 | pressure regulating system        |
| 3 | valve filling connection          | 6 | valve outlet connection           |

**Figure 3 — General structure of a VIPR type C design**

### 3.9 pressure regulating system

device(s) that reduce(s) the inlet pressure to a controlled outlet pressure

Note 1 to entry: A pressure regulating system can comprise of one or more stages of pressure regulation.

### 3.10 valve operating mechanism

mechanism which closes and opens the valve orifice and which includes the internal and external sealing systems

Note 1 to entry: For a VIPR, the valve operating mechanism is called the primary valve operating mechanism.

Note 2 to entry: For a VIPR type B, the pressure regulating system is also acting as the primary valve operating mechanism.

EXAMPLE A threaded valve spindle which, when rotated, raises and lowers a seal/seat.

### 3.11 valve operating device

component which actuates the *valve operating mechanism* (3.10)

EXAMPLE Handwheel (including knob), key, toggle, lever or actuator.

### 3.12 external leak tightness

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

Note 1 to entry: The total external leakage typically comprises that from the valve external sealing system plus, for example, pressure relief device, RPD, pressure indicating devices and pressure regulating system.

Note 2 to entry: See [Figure 4](#).