# INTERNATIONAL STANDARD

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# Gas cylinders — Quick-release cylinder valves — Specification and type testing

Bouteilles à gaz — Robinets de bouteilles à ouverture rapide — Spécifications et essais de type

## iTeh STANDARD PREVIEW (standards.iteh.ai)

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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 <a href="https://www.iso.org/directives">www.iso.org/directives</a>).

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 <a href="https://www.iso.org/patents">www.iso.org/patents</a>).

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

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ASO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 58, Gas cylinders, Subcommittee SC 2, Cylinder fittings.

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### Introduction

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

This International Standard has been written to be in conformity with the UN Model Regulations. When published, it will be submitted to the UN Subcommittee of Experts on the Transport of Dangerous Goods with a request that it be included in the UN Model Regulations.

Where there is any conflict between this International Standard and any applicable regulation, the regulation always takes precedence

In this International Standard, the unit bar is used due to its universal use in the field of technical gases. However, it is noted that bar is not an SI unit, and that the corresponding SI unit for pressure is Pa (1 bar =  $10^5 \text{ Pa} = 10^5 \text{ N/m}^2$ ).

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

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# Gas cylinders — Quick-release cylinder valves — Specification and type testing

#### 1 Scope

This International Standard in conjunction with ISO 10297:2014 and ISO 14246:2014 specifies design, type testing, marking and manufacturing tests, and examinations requirements for quick-release cylinder valves intended to be fitted to refillable transportable gas cylinders which convey non-toxic, non-oxidizing, and non-corrosive compressed or liquefied gases or extinguishing agents charged with compressed gases to be used for fire-extinguishing, explosion protection, and rescue applications.

NOTE 1 The main application of such quick-release cylinder valves is in the fire-fighting industry. However, there are other applications such as to avalanche airbags, life raft inflation, and similar applications.

This International Standard covers the function of a quick-release cylinder valve as a closure.

This International Standard does not apply to quick-release cylinder valves for cryogenic equipment, for portable fire extinguishers, or for liquefied petroleum gas (LPG).

NOTE 2 Quick-release cylinder valves of refillable propellant gas cylinders used as part of portable fire extinguishers are also covered by this International Standard, if these cylinders are transported separately.

## 2 Normative references (standards.iteh.ai)

The following documents, in whole or in <u>parts areonormatively</u> referenced in this document and are indispensable for its papelication. For adated, references, bonly the redition 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 14246:2014, 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 given in ISO 10286, ISO 10297:2014 and the following apply.

#### 3.1

#### quick-release cylinder valve

cylinder valve with a valve operating mechanism designed for quick release of gas cylinder contents that is actuated by a valve operating device and which can be activated by an *activation device* (3.2) which might not be part of the quick-release cylinder valve

Note 1 to entry: Quick-release cylinder valves are further subdivided in accordance with <u>3.1.1</u> and <u>3.1.2</u>.

Note 2 to entry: Commonly used valve operating mechanisms are pistons, flaps, bursting discs, piercing discs, or differential pressure devices.

#### 3.1.1

#### quick-release cylinder valve of type A

quick-release cylinder valve for one-time operation for the purpose of discharging the entire contents of the gas cylinder where the valve operating mechanism is damaged/destroyed

Note 1 to entry: Consequently, the valve operating mechanism needs to be replaced or reconditioned before reuse, if intended. See ISO 22434 for further information on inspection and maintenance of cylinder valves.

#### 3.1.2

#### quick-release cylinder valve of types B to E

quick-release cylinder valve for multiple operation for the purpose of total or intermittent discharging of the contents of the gas cylinder where the valve operating mechanism remains operable

Note 1 to entry: Consequently, if the valve is to be re-used, only the valve operating device or activation device needs to be replaced or reconditioned before re-use, if at all.

- type B valve: total number of operations of the valve operating mechanism by all existing valve operating devices up to 10 times
- type C valve: total number of operations of the valve operating mechanism by all existing valve operating devices up to 100 times

Note 2 to entry: This number of operations was taken from ISO 16003 and EN 12094-4.

 type D valve: total number of operations of the valve operating mechanism by all existing valve operating devices up to 500 times

Note 3 to entry: This number of operations was taken from UL 2166, UL 2127 and FM 5600.

type E valve: total number of operations of the valve operating mechanism by all existing valve operating devices up to 2000 times

Note 4 to entry: This number of operations was taken from ISO 10297:2014.

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#### 3.2

#### activation device

means for initiating the activation of the valve operating device in order to open the associated valve operating mechanism and release the gas cylinder contents, e.g. by manual, mechanical, electrical, magnetical, thermal, hydraulical, pneumatical, or pyrotechnical means or combinations thereof

Note 1 to entry: A quick-release cylinder valve can be fitted with more than one valve activation device actuating the same valve operating device or with different valve activation devices actuating different valve operating devices.

#### **4** Requirements

#### 4.1 General requirements

Quick-release cylinder valves shall comply with the requirements of ISO 10297:2014, unless this International Standard expressly allows differing requirements or stipulates additional requirements.

It is the responsibility of the manufacturer to classify the type of the quick-release cylinder valve according to 3.1.1 (type A) or 3.1.2 (type B, C, D, or E) and to declare if the quick-release cylinder valve is designed for intermittent discharge.

#### 4.2 Differing/additional requirements

#### 4.2.1 Valve connections

Differing from the requirements given in ISO 10297:2014, 5.4, if the valve filling connection is separate from the valve outlet connection, the relevant requirements given in ISO 22435 shall be met, but the number of endurance cycles for the filling connection non-return valve shall be as given in Table 1.

For type A valves, if the non-return valve in the separate valve filling connection does not require to be replaced after each operation, it shall be subjected to a number of endurance test cycles to be specified by the manufacturer.

#### 4.2.2 Resistance to mechanical impact

Differing from the requirements given in ISO 10297:2014, 5.5.2, quick-release cylinder valves need not remain capable of being opened for emergency venting purposes if the quick-release cylinder valve has a means of safely venting the gas contents. After the impact test, the securing arrangements used shall still ensure the quick-release cylinder valve does not open.

#### 4.2.3 Valve operating device

The requirements given in ISO 10297:2014, 5.7, are not applicable, except for the requirement for the handwheel diameter.

#### 4.2.4 Leakage

Differing from ISO 10297:2014, 5.8, the total external leakage (if to be tested, see 4.2.8) shall not exceed 12 cm<sup>3</sup>/h.

#### 4.2.5 Documentation

In addition to the requirements given in ISO 10297:2014, 6.2, the manufacturer shall provide an operating instruction, including at least the following: **PREVIE** W

- a) the valve type including explanation of the related restrictions for use [e.g. application(s) and number of permitted operations as well as information on replacement or reconditioning, if applicable];
- b) the gases and extinguishing agents the valve is intended to be used with;
- c) the valve test pressure (see 4.2.3) of antiomation on the filling conditions (e.g. for liquid fireextinguishing agents charged with compressed gases: filling ratio, filling pressure and related filling temperature of compressed gas) to determine valve test pressure;
- d) all applicable activation conditions (e.g. activation pressure range, forces, angle of rotation, current and/or voltage);
- e) information on securing arrangements (see <u>4.2.10</u>);
- f) for quick-release cylinder valves with a non-return valve in the separate filling connection which will not be replaced after operation of the quick-release cylinder valve, the maximum permissible number of filling cycles which is equal to the number of endurance cycles (see <u>4.2.1</u>).

#### 4.2.6 Valve test pressure

In addition to the requirements given in ISO 10297:2014, 6.6.2,  $p_{vt}$  for liquid extinguishing agents charged with compressed gases shall be at least the developed pressure of a full gas cylinder at 65 °C. The developed pressure at 65 °C shall be calculated depending on the compressed gas and its filling pressure at a given filling temperature as well as filling ratio. The vapour pressures and volumetric expansion of all substances in the gas cylinder shall be taken into account.

NOTE 1 Liquid phase expansion coefficients and vapour pressures are for example available from NIST databases<sup>1)</sup> or from fire-extinguishing agents manufacturer's data sheets.

NOTE 2 The calculation method is given in Packing Instructions P 200 and P 206 of the UN Model Regulations.

<sup>1)</sup> NIST = National Institute of Standards and Technology, USA, <u>www.nist.gov</u>.