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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

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Contents

Page

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).

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.

This document was prepared by Technical Committee ISO/TC 58, *Gas cylinders*, Subcommittee SC 2, *Cylinder fittings,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 23, *Transportable gas cylinders*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 17871:2015), which has been technically revised. It also incorporates the Amendment ISO 17871:2015/Amd 1:2018.

The main changes compared to the previous edition are as follows:

— extension of the scope to pressure drums and tubes;

— addition of the valve burst test pressure;

— deletion of the flame impingement test;

— deletion of internal leak tightness test at −40 °C for quick-release cylinder valves only used for fixed fire-fighting systems installed in buildings;

— complete revision of 4.2.11 and Annex A.

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 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) can be covered by other standards and/or regulations.

Quick-release cylinder valves complying with 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);

c) testing;

d) marking.

This document has been written so that it is suitable to be referenced in the UN Model Regulations[1].

In this document, 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 Pa = 10^5 N/m^2).

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

Charging of agents with a compressed gas is in some areas, e.g. fire-fighting, referred to as super-pressurization.

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

1 Scope

This document, in conjunction with ISO 10297 and ISO 14246, 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, pressure drums and tubes which convey:

— non-toxic;

— non-oxidizing;

— non-flammable; 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.

NOTE 2 Where there is no risk of ambiguity, gas cylinders, pressure drums and tubes are addressed with the collective term “cylinders” within this document.

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

This document does not apply to quick-release cylinder valves for cryogenic equipment and for liquefied petroleum gas (LPG).

This document does not apply to quick-release cylinder valves if used as the main closure of portable fire extinguishers because portable fire extinguishers are not covered by transport regulation.

Quick-release cylinder valves of auxiliary refillable propellant gas cylinders used within or as part of portable fire extinguishers are covered by this document, if these cylinders are transported separately, e.g. for filling (see Bibliographic entry [1], Chapter 3.3, Special Provision 225, second note).

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+Amd.1:2017, *Gas cylinders — Cylinder valves — Specification and type testing*

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 given in ISO 10286, ISO 10297 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
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 which can be activated by an *activation device* (3.4) 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 3.2 and 3.3.

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

3.2
quick-release cylinder valve of type A
quick-release cylinder valve (3.1) for one-time operation for the purpose of discharging the entire contents of the gas cylinder where the valve operating mechanism is designed to be damaged/destroyed when operated

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

3.3
quick-release cylinder valve of types B to E
quick-release cylinder valve (3.1) 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 but is designed for no more than a specific number of cycles of use

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. The total number of operations of the valve operating mechanism by all existing valve operating devices is:

— type B valve: up to 10 times (as defined in ISO 16003);

— type C valve: up to 100 times (as defined in EN 12094-4);

— type D valve: up to 500 times (as defined in UL 2166, UL 2127 and FM 5600);

— type E valve: up to 2 000 times (as defined in ISO 10297).

3.4
activation device
means for initiating the activation of the valve operating device

EXAMPLE Manually, mechanically, electrically, magnetically, thermally, hydraulically, pneumatically, pyrotechnically or a combination thereof.

Note 1 to entry: A quick-release cylinder valve can be fitted with multiple valve activation devices and/or multiple valve operating devices.

4 Requirements

4.1 General requirements

Quick-release cylinder valves shall comply with all requirements of ISO 10297, unless this document 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 the definitions in 3.2 (type A) or 3.3 (type B, C, D, or E) and to declare if the quick-release cylinder valve is designed for intermittent or total discharge.

For type A valves for auxiliary refillable propellant gas cylinders with a water capacity of not more than 1,5 l, and where each filling requires the replacement of the valve operating mechanism, the material requirements for the valve body given in ISO 10297:2014+Amd.1:2017, 5.2, do not apply because for such designs the neck of the cylinder acts as the valve body.

4.2 Differing/additional requirements

4.2.1 Valve connections

Differing from the requirements given in ISO 10297:2014+Amd.1:2017, 5.4, if the valve filling connection is separate from the valve outlet connection, the relevant requirements for the endurance test of the separate filling connection closure device given in ISO 22435 shall be met, but the number of endurance cycles for the filling connection closure device shall be as specified by the manufacturer.

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+Amd.1:2017, 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 mechanism

Differing from the requirements given in ISO 10297:2014+Amd.1:2017, 5.6.3, the number of endurance cycles is given in Table 1.

4.2.4 Valve operating device

The requirements given in ISO 10297:2014+Amd.1:2017, 5.7, are not applicable, except for the requirement for the handwheel diameter.

4.2.5 Leakage

Differing from ISO 10297:2014+Amd.1:2017, 5.8, the total external leakage (if to be tested, see 4.2.9) shall not exceed 12 cm^3/h.