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ISO 11117

Third edition
2019-11

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

Bouteilles à gaz — Chapeaux fermés et chapeaux ouverts de protection des robinets — Conception, construction et essais

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Foreword

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

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This third edition cancels and replaces the second edition (ISO 11117:2008), which has been technically revised. It also incorporates the Technical Corrigendum ISO 11117:2008/Cor.1:2009. The main changes compared to the previous edition are as follows:

— clarification of requirements for "ISO P A" marking,

— removal of Figure 2,

— substitution of Figure 1 by Figure 1 a) and b), and Figure 3 a) and b),

— addition of other threads than W 80 × 1/11,

— renaming and modification of the "axial test" as "vertical pull test",

— modification of the "drop test" including acceptance criteria,

— modification of marking requirements,

— addition of requirements for the test report,

— removal of normative Annex A "Marking of caps".

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.

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Introduction

This document covers devices intended for the protection of cylinder valves, where such protection is fitted to allow safe transport, handling and storage.

This document specifies the principal dimensions, requirements for fitment and drop test procedure, to confirm the provision of adequate valve protection, in the event of the occurrence of a cylinder toppling from its base.

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

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

1 Scope

This document specifies the requirements for valve protection caps and valve guards used on cylinders for liquefied, dissolved or compressed gases.

Valve protection caps and valve guards are some of the options available to protect cylinder valves, including valves with integral pressure regulators (VIPRs) during transport.

This document is applicable to valve protection caps and valve guards which inherently provide the primary protection of a cylinder valve. It can also be used to test other equipment (e.g., handling devices) attached to cylinder packages, even in cases where the cylinder valve is inherently able to withstand damage without release of the content.

This document excludes protection devices for cylinders with a water capacity of 5 l or less and cylinders whereby the protection device is fixed by means of lugs welded or brazed to the cylinder, or is welded or brazed directly to the cylinder. This document does not cover valve protection for breathing apparatus cylinders.

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NOTE Small cylinders (e.g., medical cylinders) are commonly transported in an outer-packaging (e.g., pallet) to meet transport regulations.

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This document does not specify requirements that could be necessary to enable the valve protection device to be used for lifting the cylinder.

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

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:

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

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

3.1
valve protection cap
device protecting the valve during handling, transport and storage, which is removed for access to the valve to allow for connection, disconnection, opening and closing

[SOURCE: ISO 10286:2015, 360, modified]

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3.2
valve guard
device protecting the valve during handling, transport and storage, which does not need to be removed for access to the valve

Note 1 to entry: There are two types of valve guards: rotational and non-rotational valve guards.

[SOURCE: ISO 10286:2015, 361, modified and Note 1 to entry added.]

3.3
test valve
valve used for the drop test to qualify the valve protection device

3.4
permitted mass
maximum mass of the cylinder package, including its permanent attachments and its maximum contents, to which the protection device is intended to be fixed

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

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

4 General requirements for valve protection cap and valve guard

4.1 Valve protection cap

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A valve protection cap shall be of adequate strength to protect the valve.

It shall be capable of being securely fixed to the cylinder, either by screwed thread or other suitable means.

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Figure 1 gives examples of valve protection caps.

The dimensions given in Figure 1 are only mandatory in the special case that valve protection caps are designed to protect valves that have dimensions in accordance with Figure 2, and that the value c for the height to the reference plane "*top of the cylinder*" (Key 1) in Figure 3 is as given there (i.e., ≤25 mm). Such valve protection caps will be eligible for a specific marking (see Clause 8).

Provision should be made to assist fitting or removal of the valve protection cap, for example, by inclusion of a hexagonal boss enabling use of a wrench.

NOTE Some valve protection caps not containing an inherent removal provision can be removed using a special tool.

The valve protection cap shall be provided with sufficient venting capacity equating to a cross-sectional area of at least 157 mm^2 for a typical conventional cylinder valve.

Possible examples are:

— using two or more vent holes of at least 10 mm diameter (see Figure 1) situated symmetrically so that any thrust caused by venting gas is balanced,

— using other means of venting, e.g., lifting under pressure (see Figure 6 a).

Quick-release cylinder valves as designed according to ISO 17871 can have a larger discharge capacity than typical conventional cylinder valves. In such a case, the venting capacity of the valve protection cap shall be assessed.

Water drainage shall be considered for all types of valve protection caps.

If a threaded fixing connection is used, it is recommended to conform to the dimensions given in Figure 4 or Figure 5. The valve protection cap shall be of such dimensions as not to contact any part of the valve.

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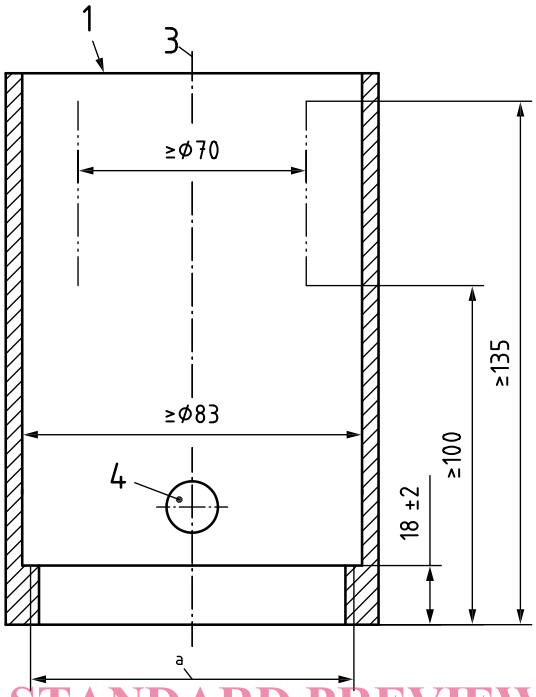
For thread dimensions, see Tables 1 to 4.

Dimensions in millimetres



a) Open valve protection cap

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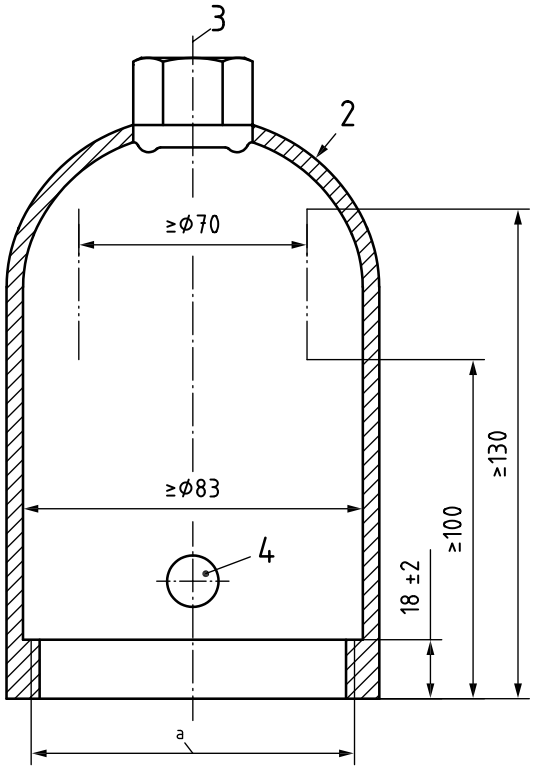

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b) Closed valve protection cap

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Key

1	open valve protection cap	3	cylinder axis
2	closed valve protection cap	4	vents Ø ≥ 10 mm, diametrically opposed

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NOTE The outlines and dimensions given are typical for ISO valve protection caps in common use. W 80 × 1/11 fixing connection (see Figure 4 and Tables 1 and 2) is commonly used. Any other shape, dimensions and/or connection thread can be used (see e.g., Figure 5 and Tables 3 and 4), provided they give appropriate clearance around the valve.

[a] Thread with a major diameter between 78–80 mm.

Figure 1 — Examples of valve protection caps with basic dimensions for valves according to Figure 2

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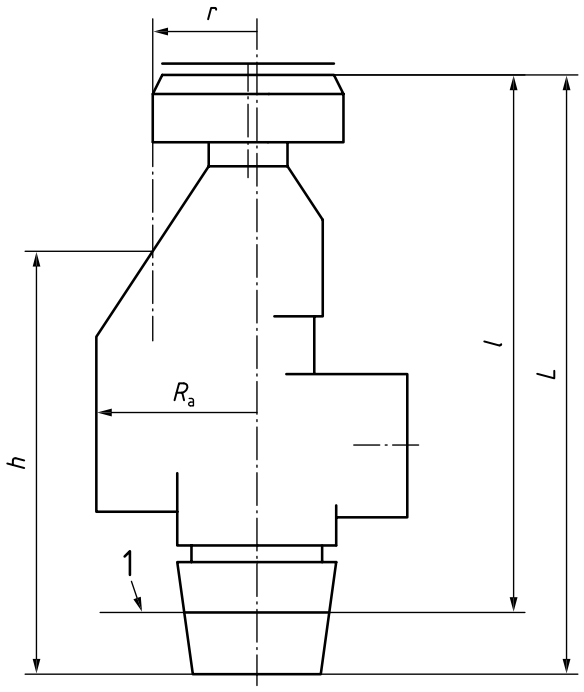

Key

$r \leq 32{,}5$ mm $h \leq 90$ mm

$R \leq 38$ mm $L \leq 125$ mm

1 reference plane (top of the cylinder) as given in Figure 3 $l \leq 105$ mm

[a] R shall be measured to the part of the valve furthest from the valve stem axis and includes any valve outlet plugs or caps if fitted.

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NOTE 1 h represents the length of the lower part of the valve when R is greater than r.

NOTE 2 L is the overall length of the valve along the axis of the valve inlet connection in the closed position when not fitted to a cylinder.

NOTE 3 r relates to the axis of the valve inlet connection and not to the centreline of the valve operating device.

NOTE 4 This figure is based on ISO 10297:2014, Figure 9.

Figure 2 — Dimensions of a cylinder valve

4.2 Valve guard

A valve guard shall be of adequate strength to protect the valve.

It shall be fixed so as to prevent inadvertent removal by the end user or dismantling under normal service conditions.

Consideration shall be given to the design of valve guards fixed only to the valve to ensure the valve guard does not initiate unscrewing of the valve from the cylinder.

The design of valve guards and their mounting on the cylinder package shall permit ease of access for valve operation and assembly of operational equipment. Rotational valve guards shall be capable of easy manual orientation to allow alignment of openings with the valve connections.

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