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ISO 11118

Gas cylinders — Non-refillable metallic gas cylinders — Specification and test methods

Bouteilles à gaz — Bouteilles à gaz métalliques non rechargeables — Spécifications et méthodes d'essai

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Contents

Page

Foreword ..... **v**
Introduction ..... **vi**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **2**
4 Symbols **3**
5 Materials **3**
5.1 General requirements 3
5.2 Material types 4
5.2.1 Carbon and low-alloy steels 4
5.2.2 Aluminium and aluminium alloy 4
5.2.3 Austenitic stainless steels 4
5.3 Chemical compositions 5
5.3.1 Carbon and low-alloy steels 5
5.3.2 Aluminium and aluminium alloys 6
6 Inspection and testing **6**
7 Design **6**
7.1 General requirements 6
7.2 Calculation of pressure containing parts 6
7.3 Design drawings 7
8 Construction and workmanship **7**
8.1 Construction 7
8.1.1 Types of construction of cylinder shell 7
8.1.2 Cylinder non-refillability 11
8.1.3 Pressure relief devices 11
8.2 Workmanship 11
9 Type approval procedure **12**
9.1 General requirements 12
9.2 Prototype tests 12
9.2.1 General 12
9.2.2 Material tests 12
9.2.3 Tensile tests 13
9.2.4 Burst tests 14
9.2.5 Drop tests 16
9.2.6 Dimension checks 17
9.2.7 Valve to cylinder interface test 18
9.3 Design type approval 18
10 Batch tests **18**
10.1 General requirements 18
10.2 Failure to meet test requirements 18
11 Tests on every cylinder **19**
11.1 Inspection 19
11.2 Proof pressure test 19
11.3 Leak testing 19
11.4 Rejection criteria 19
11.5 Repairs 19
12 Markings **19**
12.1 General 19
12.2 Manufacturing and operational markings 19
12.3 Other markings 20

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13 Test reports and certificate of conformance **20**
Annex A (normative) **Non-refillable sealing devices — Specifications and prototype testing** **21**
Annex B (informative) **Type approval certificate** **27**
Annex C (informative) **Certificate of conformance** **29**
Annex D (informative) **Yield point elongation (YPE)** **31**
Bibliography **34**

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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 document 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 3, *Cylinder design*, 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 third edition cancels and replaces the second edition (ISO 11118:2015), which has been technically revised. It also incorporates the Amendment ISO 11118:2015/Amd 1:2019.

The main changes are as follows:

— the normative references have been updated;

— verification of minimum cylinder shell wall thickness has been added;

— the calculation of determination of minimum wall thickness has been simplified by fixing the “F” factor;

— welding qualification, including defining process and operator, has been modified;

— testing of nonrefillable valve sampling has been clarified;

— marking requirements based on UN Model Regulation requirements have been clarified.

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

The purpose of this document is to facilitate agreement on the design and manufacture of non-refillable metallic gas cylinders and their sealing devices in all countries. The requirements are based on knowledge of, and experience with, materials, design requirements, manufacturing processes and controls in common use for the manufacture of gas cylinders.

This document has been written so that it is suitable to be referenced in the UN Model Regulations[10].

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 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.

Any tolerances given in this document include measurement uncertainties.

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Gas cylinders — Non-refillable metallic gas cylinders — Specification and test methods

1 Scope

This document specifies requirements for the material, design, inspections, construction and workmanship, manufacturing processes, and tests at manufacture of non-refillable metallic gas cylinders of welded, brazed, or seamless construction. This document also specifies the requirements for the non-refillable sealing devices and their methods of testing. It is applicable to non-refillable metallic gas cylinders for compressed and liquefied gases.

NOTE The specific gases permitted in cylinders constructed to this document can be limited by national or international requirements.

This document is applicable to cylinders where:

a) the test pressure does not exceed 250 bar[1)] (i.e. $p_h \leq 250$ bar) for liquefied gases and 450 bar for compressed gases; or

b) the product of the test pressure and the water capacity does not exceed 1 000 bar·litres (i.e. $p_h V \leq 1\,000$ bar l); or

c) the test pressure exceeds 45 bar and the water capacity does not exceed 5 l (i.e. for $p_h > 45$ bar, then $V \leq 5$ l).

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 3651-2, *Determination of resistance to intergranular corrosion of stainless steels — Part 2: Ferritic,austenitic and ferritic-austenitic (duplex) stainless steels — Corrosion test in media containing sulfuric acid*

ISO 4706:2023, *Gas cylinders — Refillable welded steel cylinders — Test pressure 60 bar and below*

ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature*

ISO 7866:2012, *Gas cylinders — Refillable seamless aluminium alloy gas cylinders — Design, construction and testing*

ISO 9329-1, *Seamless steel tubes for pressure purposes — Technical delivery conditions — Part 1: Unalloyed steels with specified room temperature properties*

ISO 9809-1:2019, *Gas cylinders — Design, construction and testing of refillable seamless steel gas cylinders and tubes — Part 1: Quenched and tempered steel cylinders and tubes with tensile strength less than 1 100 MPa*

ISO 9809-4:2021, *Gas cylinders — Design, construction and testing of refillable seamless steel gas cylinders and tubes — Part 4: Stainless steel cylinders with an R_m value of less than 1 100 MPa*

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 — Vocabulary*

1) 1 bar = 0,1 MPa = 10^5 Pa; 1 MPa = 1 N/mm^2

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ISO 10297, *Gas cylinders — Cylinder valves — Specification and type testing*

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 13769, *Gas cylinders — Stamp marking*

ISO 15614-1, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys*

ISO 15614-12, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 12: Spot, seam and projection welding*

ISO 20703:2006, *Gas cylinders — Refillable welded aluminium-alloy cylinders — Design, construction and 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 https://www.electropedia.org/

3.1
batch
<non-refillable metallic gas cylinders> quantity of completed and pressure tested cylinders made consecutively by the same manufacturer using the same manufacturing techniques to the same design, size, and material specifications using the same type of welding machines (when applicable), welding procedures (when applicable), and to the same heat treatment conditions (when applicable)

Note 1 to entry: See Clause 10 for details.

3.2
cylindrical shell
portion of the cylinder shell excluding the cylinder ends which is parallel to the centreline axis of the cylinder

3.3
cylinder shell
empty cylinder before affixing the *non-refillable sealing device* (3.12), but including all other permanent attachments

3.4
material certificate
document issued by the material manufacturer which certifies the chemical analysis, mechanical properties, heat treatment, processing techniques, or other properties/features if required

3.5
burst pressure
highest pressure reached in a cylinder during the burst test

3.6
test pressure
required pressure applied during the pressure test

3.7
working pressure
settled pressure of compressed gas at a uniform reference temperature of 15 °C (288 K) in a full gas cylinder

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