



SLOVENSKI STANDARD
oSIST prEN ISO 11118:2024
01-februar-2024

Plinske jeklenke - Kovinske plinske jeklenke za enkratno polnitev - Specifikacija in preskusne metode (ISO/DIS 11118:2023)

Gas cylinders - Non-refillable metallic gas cylinders - Specification and test methods (ISO/DIS 11118:2023)

Gasflaschen - Metallische Einwegflaschen - Spezifikationen und Prüfverfahren (ISO/DIS 11118:2023)

Bouteilles à gaz - Bouteilles à gaz métalliques non rechargeables - Spécifications et méthodes d'essai (ISO/DIS 11118:2023)

Ta slovenski standard je istoveten z: prEN ISO 11118

[oSIST prEN ISO 11118:2024](#)

<http://standards.iteh.ai/catalog/standards/sist/prEN/ISO/11118/2024>

ICS:

23.020.35 Plinske jeklenke Gas cylinders

oSIST prEN ISO 11118:2024 **en,fr,de**

DRAFT INTERNATIONAL STANDARD

ISO/DIS 11118

ISO/TC 58/SC 3

Secretariat: BSI

Voting begins on:
2023-12-27Voting terminates on:
2024-03-20

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

ICS: 23.020.35

iTeh Standards (<https://standards.iteh.ai>) Document Preview

[oSIST prEN ISO 11118:2024](https://standards.iteh.ai/catalog/standards/sist/11fd1ec1-12de-4dbc-8a8f-255c7c33e5ee/osist-pren-iso-11118-2024)<https://standards.iteh.ai/catalog/standards/sist/11fd1ec1-12de-4dbc-8a8f-255c7c33e5ee/osist-pren-iso-11118-2024>

This document is circulated as received from the committee secretariat.

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

ISO/CEN PARALLEL PROCESSING



Reference number
ISO/DIS 11118:2023(E)

© ISO 2023

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

[oSIST prEN ISO 11118:2024](https://standards.iteh.ai/catalog/standards/sist/11fd1ec1-12de-4dbc-8a8f-255c7c33e5ee/osist-pren-iso-11118-2024)

<https://standards.iteh.ai/catalog/standards/sist/11fd1ec1-12de-4dbc-8a8f-255c7c33e5ee/osist-pren-iso-11118-2024>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2023

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

	Page
Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Symbols	3
5 Materials	4
5.1 General requirements.....	4
5.2 Material types.....	4
5.2.1 Carbon and low-alloy steels.....	4
5.2.2 Aluminium and aluminium alloy.....	5
5.2.3 Austenitic stainless steels.....	5
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.....	7
7.3 Design drawings.....	7
8 Construction and workmanship	8
8.1 Construction.....	8
8.1.1 Types of construction of cylinder shell.....	8
8.1.2 Cylinder non-refillability.....	12
8.1.3 Pressure relief devices.....	12
8.2 Workmanship.....	12
9 Type approval procedure	12
9.1 General requirements.....	12
9.2 Prototype tests.....	13
9.2.1 General.....	13
9.2.2 Material tests.....	13
9.2.3 Tensile tests.....	14
9.2.4 Burst tests.....	15
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	18
11.1 Visual inspection.....	18
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

ISO/DIS 11118:2023(E)

12.3 Other markings.....	20
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

iTeh Standards
 (<https://standards.iteh.ai>)
 Document Preview

[oSIST prEN ISO 11118:2024](https://standards.iteh.ai/catalog/standards/sist/11fd1ec1-12de-4dbc-8a8f-255c7c33e5ee/osist-pren-iso-11118-2024)

<https://standards.iteh.ai/catalog/standards/sist/11fd1ec1-12de-4dbc-8a8f-255c7c33e5ee/osist-pren-iso-11118-2024>

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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO'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 3, *Cylinder design*.

This third edition cancels and replaces the second edition (ISO 11118: 2015) and Amendment 1, which have been technically revised with the following changes:

- Information was added to ISO 11118 from Amendment A
- Updated reference documents in the Reference section ²⁰²⁴
- Added verification of minimum cylinder shell wall thickness
- Clarification of marking requirements based on UN Model Regulation requirements
- Considered and included clarifications requested by ISO/TC58/SC3/TF3 and supported by ISO/TC58/SC3

ISO/DIS 11118:2023(E)

Introduction

This International Standard addresses the general requirements on design, construction, and initial inspection and testing of non-refillable metallic gas cylinders and their non-refillable sealing devices. The purpose of this International Standard is to provide a specification for the design, manufacture, inspection, and testing of non-refillable metallic gas cylinders for worldwide safe use, handling, and transport.

The objective is to balance design and economic efficiency against international acceptance and universal utility.

This International Standard aims to eliminate the concern about climate, duplicate inspections, and restrictions currently existing because of lack of definitive International Standards. This International Standard does not reflect on the suitability of the practice of any nation or region.

This document has been prepared to address the general requirements in Chapter 6.2 of the UN model regulations for the transportation of dangerous goods ST/SG/AC.10/1 Rev. 22¹.

iTeh Standards (<https://standards.iteh.ai>) Document Preview

[oSIST prEN ISO 11118:2024](https://standards.iteh.ai/catalog/standards/sist/11fd1ec1-12de-4dbc-8a8f-255c7c33e5ee/osist-pren-iso-11118-2024)

<https://standards.iteh.ai/catalog/standards/sist/11fd1ec1-12de-4dbc-8a8f-255c7c33e5ee/osist-pren-iso-11118-2024>

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

1 Scope

This International Standard specifies minimum 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. The standard also includes 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 International Standard can be limited by national or international requirements.

This International Standard is applicable to cylinders where:

- the test pressure does not exceed 250 bar (i.e. $p_h \leq 250$ bar) for liquefied gases and 450 bar for compressed gases;
- 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);
- 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, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 4706:2008, *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 9606-1, *Qualification testing of welders — Fusion welding — Part 1: Steels*

ISO 9809-1:2019, *Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 1: Quenched and tempered steel cylinders 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, *Gases and gas mixtures — Determination of fire potential and oxidizing ability for the selection of cylinder valve outlets*

ISO/DIS 11118:2023(E)

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 11114-3, *Gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 3: Autogenous ignition test for non-metallic materials in oxygen atmosphere*

EN 13134, *Brazing — Procedure approval*

ISO 13585, *Brazing — Qualification testing of brazers and brazing operators*

ISO 13769, *Gas cylinders — Stamp marking*

ISO 14732, *Welding personnel — Qualification testing of welding operators and weld setters for mechanized and automatic welding of metallic materials*

ISO 15613, *Specification and qualification of welding procedures for metallic materials — Qualification based on pre-production welding test*

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*

iteh Standards
(<https://standards.iteh.ai>)
Document Preview

3 Terms and definitions

For the purposes of this document, the terms and definitions 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/>

In addition, for the purposes of this document, the following terms and definitions apply.

3.1

batch

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 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

3.8**minimum operating temperature**

minimum ambient temperature to which the cylinder contents can be exposed, but not exceeding –20 °C

Note 1 to entry: See [5.1.6](#).

3.9**non-refillable cylinder**

cylinder including a *non-refillable sealing device* ([3.12](#)) that permits the cylinder to be filled only once

Note 1 to entry: Where there is no risk of ambiguity, the short abbreviated form “cylinder” is used in this International Standard.

3.10**water capacity**

volume of water required to completely fill an empty cylinder

3.11**processor**

facility that anneals, rolls, slits, or otherwise, changes the material from the form received from the location where the steel was melted

3.12**non-refillable sealing device**

device permanently attached to the cylinder which, once activated, prevents the cylinder from being refilled

4 Symbols

a	calculated minimum thickness, in millimetres, of the cylindrical shell
D	nominal outside diameter of the cylinder, in millimetres
F	design stress factor (variable)
P_b	burst pressure of the cylinder, in bar
p_h	test pressure, in bar above atmospheric pressure
p_w	working pressure, in bar above atmospheric pressure
p_{vt}	non-refillable sealing device test pressure, in bar above atmospheric pressure

ISO/DIS 11118:2023(E)

R_{ea}	actual value of the yield strength, in megapascals, of the cylinder when tested
R_{eg}	minimum guaranteed value of the yield strength, in megapascals, for the finished cylinder
R_{ma}	actual value of the tensile strength, in megapascals, of the cylinder when tested
R_{mg}	minimum guaranteed value of the tensile strength, in megapascals, for the finished cylinder
V	water capacity of the cylinder, in litres

5 Materials

5.1 General requirements

5.1.1 Cylinder shells shall be made of carbon or low alloy steels, austenitic stainless steel, aluminium, or aluminium alloys. The materials used shall be specified by type (see [5.2](#)) and chemical composition (see [5.3](#)). Materials shall not contain seams, cracks, laminations, or other injurious defects. For material requirements of non-refillable sealing devices, see [Annex A](#).

5.1.2 The cylinder manufacturer shall specify the chemical and mechanical requirements to the material supplier.

5.1.3 The cylinder manufacturer shall obtain a material certificate from the manufacturer/processor of the material certifying the chemical analysis of the cast. The certificate shall be issued by the manufacturer of the material and shall confirm compliance to the material specification.

5.1.4 The cylinder manufacturer shall verify that the materials are in accordance with the cylinder manufacturer specifications.

5.1.5 All materials used in the construction of the pressure containing parts of the cylinder shall be traceable.

5.1.6 All materials shall be suitable for use at the minimum operating temperature or at $-20\text{ }^{\circ}\text{C}$, whichever is the lower.

5.1.7 The materials used for manufacture of the cylinder shell shall be compatible with the intended gas service as specified in ISO 11114-1 or ISO 11114-2.

5.1.8 Contact between dissimilar metals which could result in damage by galvanic corrosion shall be avoided.

5.2 Material types

5.2.1 Carbon and low-alloy steels

5.2.1.1 The steel used for the fabrication of gas cylinder shells shall be made in an electric furnace or, by the basic oxygen process, shall have non-ageing properties and shall be fully killed by aluminium and/or silicon.

5.2.1.2 Carbon steel for cold deep drawn seamless, welded, or brazed cylinder shells shall have non-ageing properties, processed free of stretcher strain, and shall be fully killed with aluminium and/or silicon. The chemical composition shall meet the requirements of [5.3.1.1](#).