SLOVENSKI STANDARD

SIST EN ISO 9809-3:2019

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Nadomešča:

SIST EN ISO 9809-3:2010

Plinske jeklenke - Konstruiranje, izdelava in preskušanje ponovno polnljivih plinskih jeklenk in velikih jeklenk iz celega iz jekla - 3. del: Jeklenke in velike jeklenke iz normaliziranih jekel (ISO 9809-3:2019)

Gas cylinders - Design, construction and testing of refillable seamless steel gas cylinders and tubes - Part 3: Normalized steel cylinders and tubes (ISO 9809-3:2019)

Gasflaschen - Gestaltung, Konstruktion und Prüfung von wiederbefüllbaren nahtlosen Gasflaschen aus Stahl - Teil 3: Flaschen aus normalisiertem Stahl (ISO 9809-3:2019)

Bouteilles à gaz - Conception, construction et essais des bouteilles à gaz et des tubes rechargeables en acier sans soudure - Partie 3: Bouteilles et tubes en acier normalisé (ISO 9809-3:2019)

Ta slovenski standard je istoveten z: **EN ISO 9809-3:2019**

ICS:

23.020.35	Plinske jeklenke	Gas cylinders

SIST EN ISO 9809-3:2019 **en,fr,de**

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 9809-3

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Supersedes EN ISO 9809-3:2010

English Version

Gas cylinders - Design, construction and testing of refillable seamless steel gas cylinders and tubes - Part 3: Normalized steel cylinders and tubes (ISO 9809-3:2019)

Bouteilles à gaz - Conception, construction et essais des bouteilles à gaz et des tubes rechargeables en acier sans soudure - Partie 3: Bouteilles et tubes en acier normalisé (ISO 9809-3:2019)

Gasflaschen - Auslegung, Herstellung und Prüfung von wiederbefüllbaren nahtlosen Gasflaschen aus Stahl - Teil 3: Flaschen aus normalisiertem Stahl (ISO 9809-3:2019)

This European Standard was approved by CEN on 25 July 2019.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN ISO 9809-3:2019) has been prepared by Technical Committee ISO/TC 58 "Gas cylinders" in collaboration with Technical Committee CEN/TC 23 “Transportable gas cylinders” the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2020, and conflicting national standards shall be withdrawn at the latest by April 2020.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 9809-3:2010.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 9809-3:2019 has been approved by CEN as EN ISO 9809-3:2019 without any modification.

INTERNATIONAL STANDARD

ISO 9809-3

Third edition
2019-08

Gas cylinders — Design, construction and testing of refillable seamless steel gas cylinders and tubes —

Part 3: Normalized steel cylinders and tubes

Bouteilles à gaz — Conception, construction et essais des bouteilles à gaz et des tubes rechargeables en acier sans soudure —
Partie 3: Bouteilles et tubes en acier normalisé

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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 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 3, *Cylinder design*.

This third edition cancels and replaces the second edition (ISO 9809-3:2010), which has been technically revised. The changes compared to the previous edition are as follows:

— water capacity extended from below 0,5 l and up to and including 450 l;

— batch size for tubes now introduced;

— bend test retained only for prototype tests;

— test requirements for check analysis (tolerances modified);

— new test requirements for threads introduced including an informative Annex F;

— original European Annexes now incorporated into the body of this document;

— Annex A "Manufacturing imperfections" now aligned with ISO/TR 16115.

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 provides a specification for the design, manufacture, inspection and testing of a seamless steel cylinder and tube. The objective is to balance design and economic efficiency against international acceptance and universal utility.

ISO 9809 (all parts) aims to eliminate existing concerns about climate, duplicate inspections and restrictions because of a lack of definitive International Standards.

This document is intended to be used under a variety of regulatory regimes and has been written so that it is suitable to be referenced in the UN Model Regulations[7].

Gas cylinders — Design, construction and testing of refillable seamless steel gas cylinders and tubes —

Part 3: Normalized steel cylinders and tubes

1 Scope

This document specifies minimum requirements for the material, design, construction and workmanship, manufacturing processes, examination and testing at the time of manufacture for refillable seamless steel gas cylinders and tubes with water capacities up to and including 450 l.

It is applicable to cylinders and tubes for compressed, liquefied and dissolved gases and for normalized or normalized and tempered steel cylinders and tubes.

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 148-1, *Metallic materials — Charpy pendulum impact test — Part 1: Test method*

ISO 6506-1, *Metallic materials — Brinell hardness test — Part 1: Test method*

ISO 6508-1, *Metallic materials — Rockwell hardness test — Part 1: Test method*

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

ISO 9712, *Non-destructive testing — Qualification and certification of NDT personnel*

ISO 10286, *Gas cylinders — Terminology*

ISO 9809-1, *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 11114-1, *Gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 1: Metallic materials*

ISO 11114-4, *Transportable gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 4: Test methods for selecting steels resistant to hydrogen embrittlement*

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

ISO 13769, *Gas cylinders — Stamp marking*

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 http://www.electropedia.org/

3.1
batch
quantity of up to 200 for cylinders and up to 50 for tubes, plus cylinders/tubes for destructive testing of the same nominal diameter, thickness, length and design made successively on the same equipment, from the same cast of steel and subjected to the same heat treatment for the same duration of time

Note 1 to entry: In this document where not specifically mentioned for "cylinder/tube" only the term "cylinder" will be used.

3.2
burst pressure
p_b
highest pressure reached in a cylinder during a burst test

3.3
design stress factor
F
ratio of equivalent wall stress at test pressure, p_h, to guaranteed minimum yield strength, R_{eg}

3.4
normalizing
heat treatment in which a cylinder is heated to a uniform temperature above the upper critical point, Ac_3, of the steel and then cooled in still air

3.5
reject
cylinder that has been set aside (Level 2 or Level 3) and not allowed to enter into service

3.6
rendered unserviceable
cylinder that has been treated in such a way as to render it impossible for it to enter into service

Note 1 to entry: Examples for acceptable methods to render cylinders unserviceable can be found in ISO 18119. Any actions on cylinders rendered unserviceable are outside the scope of this document.

3.7
repair
action to return a rejected cylinder to a Level 1 condition

3.8
tempering
toughening heat treatment which follows normalizing, in which the cylinder is heated to a uniform temperature below the lower critical point, Ac_1, of the steel

3.9
test pressure
p_h
required pressure applied during a pressure test

Note 1 to entry: Test pressure is used for cylinder wall thickness calculation.

3.10
working pressure
settled pressure of a compressed gas at a uniform reference temperature of 15 °C in a full gas cylinder

3.11
yield strength
stress value corresponding to the lower yield strength, R_{eL} or for steels which do not exhibit a defined yield, the 0,2 % proof strength (non-proportional extension), $R_{p0,2}$

Note 1 to entry: See ISO 6892-1.

4 Symbols

A	percentage elongation after fracture
a	calculated minimum thickness, in millimetres, of the cylindrical shell
a'	guaranteed minimum thickness, in millimetres, of the cylindrical shell
a_1	guaranteed minimum thickness, in millimetres, of a concave base at the knuckle (see Figure 2)
a_2	guaranteed minimum thickness, in millimetres, at the centre of a concave base (see Figure 2)
b	guaranteed minimum thickness, in millimetres, at the centre of a convex base (see Figure 1)
c	maximum permissible deviation of burst profile, in millimetres (see Figure 5)
D	nominal design outside diameter of the cylinder, in millimetres, (see Figure 1 and Figure 2)
D_f	diameter, in millimetres, of former (see Figure 6)
F	design stress factor (variable), see 7.2
H	outside height, in millimetres, of domed part (convex head or base end), (see Figure 1)
h	outside depth (concave base end), in millimetres (see Figure 2)
$l1$	length of cylindrical part of the cylinder, in millimetres (see Figure 3)
L_o	original gauge length, in millimetres, as defined in ISO 6892-1 (see Figure 8)
n	ratio of the diameter of the bend test former to actual thickness of test piece, t
p_b	measured burst pressure, in bars above atmospheric pressure
	NOTE 1 bar = 10^5 Pa = 0,1 MPa.
p_h	hydraulic test pressure, in bars, above atmospheric pressure
p_y	observed pressure when cylinder starts yielding during hydraulic bursting test, in bars
r	inside knuckle radius, in millimetres (see Figures 1 and 2)
R_{eg}	minimum guaranteed value of the yield strength (see 7.1.1), in megapascals, for the finished cylinder
R_{ea}	actual value of the yield strength, in megapascals, as determined by the tensile test (see 10.2)
R_{mg}	minimum guaranteed value of the tensile strength, in megapascals, for the finished cylinder
R_{ma}	actual value of the tensile strength, in megapascals, as determined by the tensile test (see 10.2)