Gaasiballoonid. Korduvalt täidetavad õmblusteta terasest gaasiballoonid. Kavandamine, konstruktsioon ja katsetamine. Osa 2: Karastatud ja lõõmutatud terasest balloonid tõmbetugevusega 1 100 Mpa või rohkem

Gas cylinders - Refillable seamless steel gas cylinders - Design, construction and testing - Part 2: Quenched and tempered steel cylinders with tensile strength greater than or equal to 1 100 Mpa

EESTI STANDARDIKESKUS
ESTONIAN CENTRE FOR STANDARDISATION

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN ISO 9809-2:2010 sisaldab Euroopa standardi EN ISO 9809-2:2010 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 9809-2:2010 consists of the English text of the European standard EN ISO 9809-2:2010.
Standard on kinnitatud Eesti Standardikeskuse 30.06.2010 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.	This standard is ratified with the order of Estonian Centre for Standardisation dated 30.06.2010 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.
Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 15.04.2010.	Date of Availability of the European standard text 15.04.2010.
Standard on kättesaadav Eesti standardiorganisatsioonist.	The standard is available from Estonian standardisation organisation.

ICS 23.020.30

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 9809-2

April 2010

ICS 23.020.30

Supersedes EN 1964-2:2001

English Version

Gas cylinders - Refillable seamless steel gas cylinders - Design, construction and testing - Part 2: Quenched and tempered steel cylinders with tensile strength greater than or equal to 1 100 MPa (ISO 9809-2:2010)

Bouteilles à gaz - Bouteilles à gaz rechargeables en acier sans soudure - Conception, construction et essais - Partie 2: Bouteilles en acier trempé et revenu ayant une résistance à la traction supérieure ou égale à 1 100 MPa (ISO 9809-2:2010)

Gasflaschen - Wiederbefüllbare nahtlose Gasflaschen aus Stahl - Gestaltung, Konstruktion und Prüfung - Teil 2: Flaschen aus vergütetem Stahl mit einer Zugfestigkeit größer als oder gleich 1 100 MPa (ISO 9809-2:2010)

This European Standard was approved by CEN on 18 March 2010.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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

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Ref. No. EN ISO 9809-2:2010: E

Foreword

This document (EN ISO 9809-2:2010) 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 October 2010, and conflicting national standards shall be withdrawn at the latest by October 2010.

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

This document supersedes EN 1964-2:2001.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For Specific European requirements, see normative Annex NA, which is an integral part of this document.

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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of ISO 9809-2:2010 has been approved by CEN as a EN ISO 9809-2:2010 without any modification.

Annex NA
(normative)
Specific European requirements

NA.1 Normative references

The following referenced documents are indispensable for the application 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.

EN 473, *Non-destructive testing — Qualification and certification of NDT personnel — General principles*

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

EN ISO 13769, *Gas cylinders — Stamp marking*

NA.2 Technical requirements

With reference to the clauses in the main body of the text, the following additional requirements shall apply:

5 Inspection and testing

The following informative note shall be added to Clause 5:

“NOTE The conformity of cylinders shall be assessed in accordance with the regulations in force at the time of manufacture. RID/ADR/ADN includes requirements for conformity assessment consisting of type approval, supervision of manufacture and initial inspection and test. If conformity is assessed in accordance with Council Directive 99/36/EC on transportable pressure equipment (TPED), modules B+D or B+F should be used. If other modules are used, the cylinders will not be in conformity with this standard and the number of this standard shall not be marked.”

11.2 Hydraulic test

11.2.2 Volumetric expansion test

"NOTE The initial inspection and tests regarding hydraulic test are regulated by RID, ADR which take precedence over Clause 11.2.2.

13 Marking

Marking shall be in accordance with EN ISO 13769.

"NOTE The marking of gas cylinders is regulated by RID, ADR and ADN which take precedence over any clause in this standard. The European Directive on the TPED includes additional marking requirements (π-marking). It is important to know that these provisions are subject to regular revisions. This may lead to temporary noncompliance with EN ISO 13769.”

Annex A

Annex A shall be taken as normative.

B.2 General requirements

The second paragraph shall be replaced by the following: “The operation of the test equipment shall be by personnel certified at least to level 1 of EN 473 and supervised by qualified and experienced personnel certified to level 2 or level 3 of EN 473.

Additionally the following note shall be added to the end of this clause:

"NOTE As it is considered that the qualifications of personnel according to EN 473 and ISO 9712 are comparable, certification of the personnel to either standard should be accepted.”

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Introduction

This part of ISO 9809 provides a specification for the design, manufacture, inspection and testing of a seamless steel cylinder for worldwide usage. The objective is to balance design and economic efficiency against international acceptance and universal utility.

ISO 9809 (all parts) aims to eliminate existing concern; about climate, duplicate inspections and restrictions because of a lack of definitive International Standards. This part of ISO 9809 should not be construed as reflecting on the suitability of the practice of any nation or region.

This part of ISO 9809 addresses the general requirements on design, construction and initial inspection and test of pressure receptacles of the United Nations *Recommendations on the Transport of Dangerous Goods: Model Regulations*.

It is intended to be used under a variety of regulatory regimes, but is suitable for use with the conformity assessment system in 6.2.2.5 of the above-mentioned Model Regulations.

Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing —

Part 2: Quenched and tempered steel cylinders with tensile strength greater than or equal to 1 100 MPa

1 Scope

This part of ISO 9809 specifies minimum requirements for the material, design, construction and workmanship, manufacturing processes, examination and testing at manufacture of refillable quenched and tempered seamless steel gas cylinders of water capacities from 0,5 l up to and including 150 l for compressed, liquefied and dissolved gases. This part of ISO 9809 is applicable to cylinders with a maximum tensile strength $R_{ma} \geqslant 1\,100$ MPa. It is not applicable to cylinders with $R_{ma,\,max} > 1\,300$ MPa for diameters > 140 mm and guaranteed wall thicknesses $a' \geqslant 12$ mm and $R_{ma,\,max} > 1\,400$ MPa for diameters $\leqslant 140$ mm and guaranteed wall thicknesses $a' \geqslant 6$ mm, because beyond these limits, additional requirements can apply.

NOTE 1 If desired, cylinders of water capacity less than 0,5 l and between 150 l and 500 l can be manufactured and certified to be in compliance with this part of ISO 9809.

NOTE 2 For quenched and tempered steel cylinders with maximum tensile strength less than 1 100 MPa, see ISO 9809-1. For normalized steel cylinders, see ISO 9809-3.

NOTE 3 Grades and strength ranges of steels used for these types of cylinders might not be compatible with some gas service (see 6.1.4) and operational conditions.

2 Normative references

The following referenced documents are indispensable for the application 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 (scales A, B, C, D, E, F, G, H, K, N, T)*

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

ISO 7438, *Metallic materials — Bend test*

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

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

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

ISO 13769, *Gas cylinders — Stamp marking*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
batch
quantity of up to 200 cylinders plus cylinders 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

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
quenching
hardening heat treatment in which a cylinder, which has been heated to a uniform temperature above the upper critical point, Ac_3, of the steel, is cooled rapidly in a suitable medium

3.5
tempering
toughening heat treatment which follows quenching, in which the cylinder is heated to a uniform temperature below the lower critical point, Ac_1, of the steel

3.6
test pressure
p_h
required pressure applied during a pressure test

NOTE It is used for cylinder wall thickness calculation.

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

3.8
yield strength
stress value corresponding to the upper yield strength, ReH, or for steels which do not exhibit a defined yield, the 0,2 % proof strength (non-proportional extension), Rp0, 2 (see ISO 6892-1)