SLOVENSKI STANDARD
SIST EN ISO 11120:2000

01-januar-2000

Plinske jeklenke - Ponovno polnljive velike jeklenke iz celega iz jekla za transport stisnjenega plina vodne prostornine od 150 do 3000 l - Konstruiranje, izdelava in preskušanje

Gas cylinders - Refillable seamless steel tubes for compressed gas transport, of water capacity between 150 l and 3000 l - Design construction and testing (ISO 11120:1999)

Ortsbewegliche Gasflaschen - Nahtlose wiederbefüllbare Großflaschen aus Stahl mit einem Fassungsraum zwischen 150 l und 3000 l - Gestaltung, Konstruktion und Prüfung (ISO 11120:1999)

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Bouteilles a gaz - Tubes en acier sans soudure rechargeables d'une contenance en eau de 150 l a 3000 l - Conception, construction et essais (ISO 11120:1999)

Ta slovenski standard je istoveten z: **EN ISO 11120:1999**

ICS:

23.020.30	Tlačne posode, plinske jeklenke	Pressure vessels, gas cylinders

SIST EN ISO 11120:2000 **en**

2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 11120

March 1999

ICS 23.020.30

English version

Gas cylinders - Refillable seamless steel tubes for compressed gas transport, of water capacity between 150 l and 3000 l - Design construction and testing (ISO 11120:1999)

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This European Standard was approved by CEN on 20 February 1999.

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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 Central Secretariat has the same status as the official versions.

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

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Ref. No. EN ISO 11120:1999 E

SIST EN ISO 11120:2000

Foreword

The text of the International Standard ISO 11120:1999 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 September 1999, and conflicting national standards shall be withdrawn at the latest by September 1999.

This European Standard has been submitted for reference into the RID and/or in the technical annexes of the ADR. Therefore in this context the standards listed in the normative references and covering basic requirements of the RID/ADR not addressed within the present standard are normative only when the standards themselves are referred to in the RID and/or in the technical annexes of the ADR.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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Endorsement notice

The text of the International Standard ISO 11120:1999 was approved by CEN as a European Standard without any modification.

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NOTE: Normative references to International Standards are listed in annex ZA (normative).

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Annex ZA (normative)
Normative references to international publications with their relevant European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

Publication	Year	Title	EN	Year
ISO 11114-1	1997	Transportable gas cylinders - Compatibility of cylinder and valve materials with gas contents - Part 1: Metallic materials	EN ISO 11114-1	1997

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INTERNATIONAL STANDARD

ISO 11120

First edition
1999-03-15

Gas cylinders — Refillable seamless steel tubes of water capacity between 150 l and 3 000 l — Design, construction and testing

Bouteilles à gaz — Tubes en acier sans soudure rechargeables d'une contenance en eau de 150 l à 3 000 l — Conception, construction et essais

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Reference number
ISO 11120:1999(E)

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SIST EN ISO 11120:2000

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 11120 was prepared by Technical Committee ISO/TC 58, *Gas cylinders*, Subcommittee SC 3, *Cylinder design*.

Annexes A and B form an integral part of this International Standard.

Annexes C, D and E are for information only.

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Introduction

The purpose of this International Standard is to provide a specification for the design, manufacture, inspection and testing of tubes for worldwide usage. The objective is to balance design and economic efficiency against international acceptance and universal utility.

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

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SIST EN ISO 11120:2000

Gas cylinders — Refillable seamless steel tubes of water capacity between 150 l and 3 000 l — Design, construction and testing

1 Scope

This International Standard specifies minimum requirements for the material, design, construction and workmanship, manufacturing processes and tests at manufacture of refillable quenched and tempered seamless steel tubes of water capacities from 150 l up to and including 3 000 l for compressed and liquefied gases exposed to extreme world-wide ambient temperatures (normally between −50 °C and +65 °C). This International Standard is applicable to tubes with a maximum tensile strength R_m of less than 1 100 MPa.

These tubes can be used alone or in batteries to equip trailers or skids (ISO modules) for the transportation and distribution of compressed gases.

This International Standard does not include consideration of any additional stresses that may occur during service or transport, e.g. bending stresses, etc.

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2 Normative references

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The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 148[1)], *Steel — Charpy impact test (V-notch).*

ISO 6506[2)], *Metallic materials — Hardness test — Brinell test.*

ISO 6892, *Metallic materials — Tensile testing at ambient temperature.*

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

ISO 11484, *Steel tubes for pressure purposes — Qualification and certification of non-destructive testing (NDT) personnel.*

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1) To be replaced by ISO 148-1, ISO 148-2 and ISO 148-3.

2) To be replaced by ISO 6506-1, ISO 6506-2 and ISO 6506-3.

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3 Definitions

For the purposes of this International Standard the following definitions apply.

3.1
yield stress
value corresponding to the 0,2 % proof stress, $R_{p\,0,2}$

3.2
quenching
hardening heat treatment in which a tube, 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

3.3
tempering
softening heat treatment which follows quenching, in which the tube is heated to a uniform temperature below the lower critical point Ac_1 of the steel

3.4
tube
a double ended pressure gas cylinder manufactured from seamless tubing

3.5
batch
a quantity of up to 200 tubes of the same nominal diameter, thickness and design made from the same steel cast and subjected to the same heat treatment for the same duration of time

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3.6
test pressure
required pressure (p_h) applied during a pressure test

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3.7
design stress factor
F
ratio of the equivalent wall stress at test pressure (p_h) to guaranteed minimum yield stress (R_e)

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4 Symbols

Symbol	Definition
a	calculated minimum thickness, in millimetres, of the cylindrical shell
a'	guaranteed minimum thickness, in millimetres, of the cylindrical shell
A	percentage elongation
D	nominal outside diameter of the tube, in millimetres
f	a constant in the design stress factor (see 11.3)
F	design stress factor (see 3.7)
L_0	original gauge length, in millimetres, according to ISO 6892
p_h	hydraulic test pressure, in bar[a] above atmospheric pressure
R_e	guaranteed minimum value of yield stress, in megapascals[a]
R_{ea}	value of the actual yield stress, in megapascals, determined by the tensile test
R_g	guaranteed minimum value of the tensile strength, in megapascals
R_m	actual value of tensile strength, in megapascals, determined by the tensile test
S_0	original cross-sectional area of tensile test piece, in square millimetres, according to ISO 6892
a 1 bar = 100 kPa; 1 MPa = 10 bar.	

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5 Inspection and testing

Evaluation of conformity is required to be performed in accordance with the relevant regulations of the country(ies) where the tubes are to be used.

In order to ensure that tubes are in compliance with this International Standard they shall be subject to inspection in accordance with clauses 9 and 10 by an authorized inspection body (hereafter referred to as “the inspector”) recognized in the countries of use. The inspector shall be competent for inspection of tubes.

6 Materials

6.1 General requirements

6.1.1 Materials for the manufacture of tubes shall meet the requirements of 6.2, 6.3 and 6.4.

Steels for the fabrication of tubes shall be of nationally or internationally recognized compositions having proven reliability. These steels shall fall within one of the chemical groups as shown in annex A.

New steel compositions, and steels for which limited experience exists in tube/cylinder service, shall be fully tested and approved by a national authority and have been manufactured from not less than five casts of steel.

The manufacturer of the finished tube shall provide a detailed specification with tolerances for the supplied tubing including:

— chemical composition;