

SVENSK STANDARD

SS-ISO 11119-1:2020

Gasflaskor – Konstruktion, tillverkning och provning för återfyllningsbara flaskor och storflaskor av kompositmaterial – Del 1: Dellindade fiberförstärkta gasflaskor och storflaskor av kompositmaterial , med kapacitet till och med 450 l (ISO 11119-1:2020, IDT)

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



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Standarden är framtagen av kommittén för Gasflaskor, SIS/TK 296.

Har du synpunkter på innehållet i den här standarden, vill du delta i ett kommande revideringsarbete eller vara med och ta fram andra standarder inom området? Gå in på www.sis.se - där hittar du mer information.

Den internationella standarden ISO 11119-1:2020 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av ISO 11119-1:2020.

Denna standard ersätter SS-ISO 11119-1:2012, utgåva 1

The International Standard ISO 11119-1:2020 has the status of a Swedish Standard. This document contains the official English version of ISO 11119-1:2020.

This standard supersedes the SS-ISO 11119-1:2012, edition 1

LÄSANVISNINGAR FÖR STANDARDER

I dessa anvisningar behandlas huvudprinciperna för hur regler och yttre begränsningar anges i standardiseringsprodukter.

Krav

Ett krav är ett uttryck i ett dokumentets innehåll som anger objektivet verifierbara kriterier som ska uppfyllas och från vilka ingen avvikelse tillåts om efterlevnad av dokumentet ska kunna åberopas. Krav uttrycks med hjälpverbet ska (eller ska inte för förbud).

Rekommendation

En rekommendation är ett uttryck i ett dokumentets innehåll som anger en valmöjlighet eller ett tillvägagångssätt som bedöms vara särskilt lämpligt utan att nödvändigtvis nämna eller utesluta andra. Rekommendationer uttrycks med hjälpverbet bör (eller bör inte för avrådanden).

Instruktion

Instruktioner anges i imperativ form och används för att ange hur något görs eller utförs. De kan underordnas en annan regel, såsom ett krav eller en rekommendation. De kan även användas självständigt, och är då att betrakta som krav.

Förklaring

En förklaring är ett uttryck i ett dokumentets innehåll som förmedlar information. En förklaring kan uttrycka tillåtelse, möjlighet eller förmåga. Tillåtelse uttrycks med hjälpverbet får (eller motsatsen behöver inte). Möjlighet och förmåga uttrycks med hjälpverbet kan (eller motsatsen kan inte).

READING INSTRUCTIONS FOR STANDARDS

These instructions cover the main principles for the use of provisions and external constraints in standardization deliverables.

Requirement

A requirement is an expression, in the content of a document, that conveys objectively verifiable criteria to be fulfilled, and from which no deviation is permitted if conformance with the document is to be claimed. Requirements are expressed by the auxiliary shall (or shall not for prohibition).

Recommendation

A recommendation is an expression, in the content of a document, that conveys a suggested possible choice or course of action deemed to be particularly suitable, without necessarily mentioning or excluding others. Recommendations are expressed by the auxiliary should (or should not for dissuasion).

Instruction

An instruction is expressed in the imperative mood and is used in order to convey an action to be performed. It can be subordinated to another provision, such as a requirement or a recommendation. It can also be used independently and is then to be regarded as a requirement.

Statement

A statement is an expression, in the content of a document, that conveys information. A statement can express permission, possibility or capability. Permission is expressed by the auxiliary may (its opposite being need not). Possibility and capability are expressed by the auxiliary can (its opposite being cannot).

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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*.

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.

This document has been written so that it is suitable to be referenced in the UN Model Regulations^[1].

This third edition cancels and replaces the second edition (ISO 11119-1:2012), which has been technically revised. The main changes compared to the previous edition are as follows:

- References updated.
- [7.1.3](#) Minimum fibre stress ratios added.
- [8.5.8](#) Fire resistance test. Changes to the procedure to make the test more consistent. Adding a criteria for tubes above 150 l to be tested for 5 min.
- [8.5.10](#) Torque Test is now only required for taper threads.

A list of all parts in the ISO 11119 series can be found on the ISO website.

Introduction

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

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

This document addresses the general requirements on design, construction and initial inspection and testing of pressure receptacles of the *Recommendations on the transport of dangerous goods: Model regulations* developed by the United Nations^[15].

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

Part 1:

Hoop wrapped fibre reinforced composite gas cylinders and tubes up to 450 l

1 Scope

This document specifies minimum requirements for the material, design, construction and workmanship, manufacturing processes, examination and testing at time of manufacture for:

- type 2 composite hoop wrapped cylinders or tubes with a load-sharing metal liner and composite reinforcement on the cylindrical portion only;
- water capacities up to 450 l;
- the storage and conveyance of compressed or liquefied gases;
- cylinders and tubes with composite reinforcement of carbon fibre, aramid fibre or glass fibre (or a mixture thereof) within a matrix or steel wire to provide circumferential reinforcement;
- a minimum design life of 15 years.

This document does not address the design, fitting, and performance of removable protective sleeves.

NOTE 1 References to cylinders in this document include composite tubes if appropriate.

NOTE 2 ISO 11439 applies to cylinders intended for use as fuel containers on natural gas vehicles and ISO 11623 covers periodic inspection and re-testing of composite cylinders.

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 3341, *Textile glass — Yarns — Determination of breaking force and breaking elongation*

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 7225, *Gas cylinders — Precautionary labels*

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

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 9809-2, *Gas cylinders — Design, construction and testing of refillable seamless steel gas cylinders and tubes — Part 2: Quenched and tempered steel cylinders and tubes with tensile strength greater than or equal to 1 100 MPa*

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

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

ISO 10286, *Gas cylinders — Vocabulary*

ISO 10618, *Carbon fibre — Determination of tensile properties of resin-impregnated yarn*

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*

ISO 14130, *Fibre-reinforced plastic composites — Determination of apparent interlaminar shear strength by short-beam method*

ASTM E1356–08, *Standard Test Method for Assignment of the Glass Transition Temperatures by Differential Scanning Calorimetry*

ASTM D7269, *Standard test methods for tensile testing of aramid yarns*

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 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

aramid fibre

continuous filaments of aramid laid up in tow form

3.2

autofrettage

pressure application procedure which strains the metal liner past its yield point sufficient to cause permanent plastic deformation, and results in the liner having compressive stresses and the fibres having tensile stresses when at zero internal gauge pressure

3.3

batch

set of homogeneous items or material

Note 1 to entry: The number of items in a batch can vary according to the context in which the term is used.

3.4

batch of liners

production quantity of up to 200 finished liners successively produced, plus units required for destructive testing of the same nominal diameter, length, thickness and design, from the same material cast and heat treated to the same conditions of temperature and time

3.5

batch of finished cylinders

production quantity of up to 200 finished cylinders successively produced by the same manufacturing process plus finished cylinders required for destructive testing, of the same nominal diameter, length, thickness and design

3.6

burst pressure

highest pressure reached in a cylinder during a burst test

3.7

carbon fibre

continuous filaments of carbon laid up in tow form

3.8

composite overwrap

combination of fibres (including steel wire) and matrix

3.9

dedicated gas service

service in which a cylinder is to be used only with a specified gas or gases

3.10

equivalent fibre

equivalent wire

fibre (or wire) from the same material family and similar properties to a fibre (or wire) in a previously prototype tested cylinder

3.11

equivalent liner

liner of the same alloy family, and that has certified properties and performance so as to be a directly comparable to a liner used in an already approved cylinder

3.12

equivalent matrix

resin matrix from the same chemical family and similar properties to the resin matrix used in a previously prototype tested cylinder

3.14

glass fibre

continuous filaments of glass laid up in tow form

3.15

liner

inner portion of the composite cylinder, comprising a metallic vessel, whose purpose is both to contain the gas and transmit the gas pressure to the fibres

3.16

matrix

material that is used to bind and hold the fibres in place

3.18

thermoplastic

plastics capable of being repeatedly softened by increase of temperature and hardened by decrease of temperature

3.19

thermosetting

plastics that, when cured by the application of heat or chemical means, harden permanently into a substantially infusible and insoluble product