

# SVENSK STANDARD

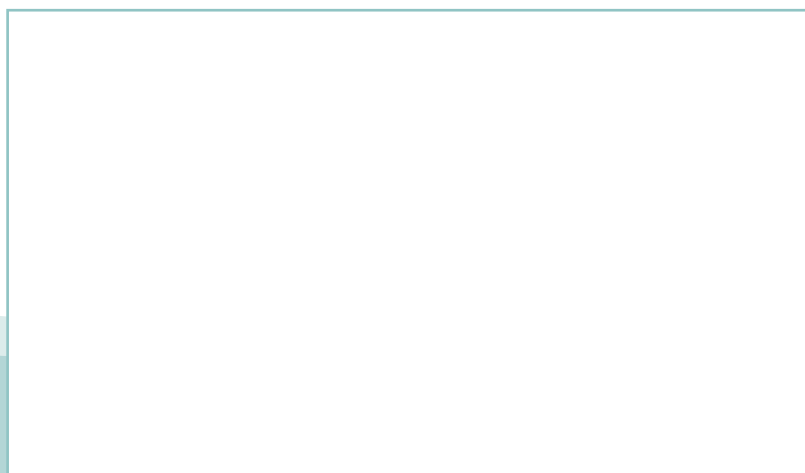
## SS-ISO 11119-1:2012

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**Gasflaskor – Återfyllningsbara flaskor och storflaskor av kompositmaterial – Konstruktion, tillverkning och provning – Del 1: Dellindade fiberförstärkta gasflaskor och storflaskor av kompositmaterial, med kapacitet till och med 450 l (ISO 11119-1:2012, IDT)**

**Gas cylinders – Refillable composite gas cylinders and tubes – Design, construction and testing – Part 1: Hoop wrapped fibre reinforced composite gas cylinders and tubes up to 450 l (ISO 11119-1:2012, IDT)**



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Den internationella standarden ISO 11119-1:2012 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av ISO 11119-1:2012.

The International Standard ISO 11119-1:2012 has the status of a Swedish Standard. This document contains the official version of ISO 11119-1:2012.

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*Information about the content of the standard is available from the Swedish Standards Institute (SIS), telephone +46 8 555 520 00. Standards may be ordered from SIS Förlag AB, who can also provide general information about Swedish and foreign standards.*

Denna standard 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](http://www.sis.se) - där hittar du mer information.



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**SS-ISO 11119-1:2012 (E)****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 2.

The main task of technical committees is to prepare International Standards. 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.

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.

ISO 11119-1 was prepared by Technical Committee ISO/TC 58, *Gas cylinders*, Subcommittee SC 3, *Cylinder design*.

This edition cancels and replaces ISO 11119-1:2002.

ISO 11119 consists of the following parts, under the general title *Gas cylinders — Refillable composite gas cylinders and tubes — Design, construction and testing*:

- *Part 1: Hoop wrapped fibre reinforced composite gas cylinders and tubes up to 450 l*
- *Part 2: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 l with load-sharing metal liners*
- *Part 3: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 l with non-load-sharing metallic or non-metallic liners*

The following part is under preparation:

- *Part 4: Fully wrapped fibre reinforced composite gas cylinders with load-sharing welded metal liners*

## Introduction

The purpose of this International Standard 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 International Standard 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 part of ISO 11119 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 (Reference [15]).





# Gas cylinders — Refillable composite gas cylinders and tubes — Design, construction and testing —

## Part 1: Hoop wrapped fibre reinforced composite gas cylinders and tubes up to 450 l

### 1 Scope

This part of ISO 11119 specifies requirements for composite gas cylinders and tubes between 0,5 l and 450 l water capacity, for the storage and conveyance of compressed or liquefied gases.

This part of ISO 11119 applies to type 2 hoop wrapped cylinder or tube with a load-sharing metal liner and composite reinforcement on the cylindrical portion only.

This part of ISO 11119 is limited to 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.

Cylinders complying with this part of ISO 11119 have a minimum design life of 15 years.

This part of ISO 11119 does not address the design, fitting, and performance of removable protective sleeves.

NOTE ISO 11439<sup>[5]</sup> applies to cylinders intended for use as fuel containers on natural gas vehicles and ISO 11623<sup>[6]</sup> covers periodic inspection and re-testing of composite cylinders.

### 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 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 (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 7225, *Gas cylinders — Precautionary labels*

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

ISO 9809-1, *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 9809-2, *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 9809-3, *Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 3: Normalized steel cylinders*

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

**SS-ISO 11119-1:2012 (E)**

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

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

ISO 13769, *Gas cylinders — Stamp marking*

EN 1964-3, *Transportable gas cylinders — Specification for the design and construction of refillable transportable seamless steel gas cylinders of water capacities from 0,5 litre up to and including 150 litres — Part 3: Cylinders made of seamless stainless steel with an  $R_m$  value of less than 1 100 MPa*

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

### **3 Terms and definitions**

For the purposes of this document, the following terms and definitions apply. References to cylinders are to include composite tubes as appropriate.

#### **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 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 or wire**

fibre or wire equivalent to a fibre or wire in a previously prototype tested cylinder

**3.11****equivalent liner**

liner that has certified properties and performance so as to be a direct equivalent to a liner used in an already approved cylinder

**3.12****exterior coating**

layers of material applied to the cylinder as protection or for cosmetic purposes

NOTE The coating can be clear or pigmented.

**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

**3.17****steel wire**

steel wire wound under tension

**3.18****thermoplastic material**

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

**3.19****thermosetting material**

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

**3.20****type 2 cylinder**

hoop wrapped cylinder with a load-sharing metal liner and composite reinforcement on the cylindrical portion only

**3.21****working pressure**

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

**3.22****nominal outside diameter**

diameter of the cylinder specified by the manufacturer for the type approval including tolerances (e.g.  $\pm 1$  %)

## 4 Symbols and units

Symbols and their designations