
**Gas cylinders of composite construction —
Specification and test methods —**

Part 1:

Hoop wrapped composite gas cylinders

Bouteilles à gaz composites — Spécifications et méthodes d'essai —

Partie 1: Bouteilles à gaz frettées en matériau composite



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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.

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

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 part of ISO 11119 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*.

ISO 11119 consists of the following parts, under the general title *Gas cylinders of composite construction — Specification and test methods*:

- *Part 1: Hoop wrapped composite gas cylinders*
- *Part 2: Fully wrapped fibre reinforced composite gas cylinders with load-sharing metal liners*
- *Part 3: Fully wrapped fibre reinforced composite gas cylinders with non-metallic and non-load-sharing metal liners*

Annexes A and B of this part of ISO 11119 are for information only.

Introduction

The purpose of ISO 11119 is to provide a specification for the design, manufacture, inspection and testing of a cylinder for world-wide usage. The objective is to balance design and economic efficiency against international acceptance and universal utility.

ISO 11119 aims to eliminate the concern about climate, duplicate inspection and restrictions currently existing because of lack of definitive International Standards and should not be construed as reflecting on the suitability of the practice of any nation or region.

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Gas cylinders of composite construction — Specification and test methods —

Part 1:

Hoop wrapped composite gas cylinders

1 Scope

This part of ISO 11119 specifies requirements for composite gas cylinders up to and including 450 litres water capacity, for the storage and conveyance of compressed or liquefied gases with test pressures up to and including 650 bar ¹⁾. The cylinders are constructed in the form of a seamless metallic liner over-wrapped with carbon fibre or aramid fibre or glass fibre (or a mixture thereof) in a resin matrix, or steel wire, to provide circumferential reinforcement.

This part of ISO 11119 addresses cylinders with a design life from 10 a to non-limited life. For cylinders with a design life in excess of 15 a, and in order for these cylinders to remain in service beyond 15 a, requalification of these cylinders is recommended.

This part of ISO 11119 does not address the design, fitting and performance of removable protective sleeves. Where these are fitted, they should be considered separately.

NOTE 1 ISO 11439 applies to cylinders intended for use as fuel containers on natural gas vehicles.

NOTE 2 ISO 11623 covers periodic inspection and retesting of composite cylinders.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 11119. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 11119 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 6506-1:1999, *Metallic materials — Brinell hardness test — Part 1: Test method*

ISO 6508-1:1999, *Metallic materials — Rockwell hardness test — Part 1: Test method (scales A, B, C, D, E, F, G, H, K, N, T)*

ISO 6892:1998, *Metallic materials — Tensile testing at ambient temperature*

ISO 7225:1994, *Gas cylinders — Precautionary labels*

ISO 7866:1999, *Gas cylinders — Refillable seamless aluminium alloy gas cylinders — Design, construction and testing*

1) 1 bar = 10⁵ Pa.

ISO 9809-1:1999, *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 9809-2:2000, *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 11114-1:1997, *Transportable gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 1: Metallic materials*

ISO 11439:2000, *Gas cylinders — High pressure cylinders for the on-board storage of natural gas as a fuel for automotive vehicles*

ISO 13341:1997, *Transportable gas cylinders — Fitting of valves to gas cylinders*

ISO 13769:— ²⁾, *Gas cylinders — Stamp marking*

EN 1964-3:2000, *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 D 2343, *Standard Test Method for Tensile Properties of Glass Fiber Strands, Yarns, and Rovings Used in Reinforced Plastics*

ASTM D 4018, *Standard Test Methods for Properties of Continuous Filament Carbon and Graphite Fiber Tows*

SACMA SRM 16R-94, *Recommended Test Method for Tow Tensile Testing of Carbon Fibers*

3 Terms and definitions

For the purposes of this part of ISO 11119, the following terms and definitions apply.

3.1

aramid fibre

continuous filaments of aramid laid up in tow form, used for reinforcement

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

collective term for a set of homogeneous items or material

NOTE The number of items in a batch may vary according to the context in which the term is used

3.3.1

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

2) To be published.