



BSI Standards Publication

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

Part 3: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 l with non-load-sharing metallic or non-metallic liners or without liners

This is a preview of BS ISO 11119-3:2020+A1:2023. [Click here to purchase the full version from the ANSI store.](#)

National foreword

This British Standard is the UK implementation of ISO 11119-3:2020+A1:2023. It supersedes BS ISO 11119-3:2020, which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to ISO text carry the number of the ISO amendment. For example, text altered by ISO amendment 1 is indicated by A1 A1.

The UK participation in its preparation was entrusted to Technical Committee PVE/3/3, Transportable Gas Containers - Cylinder Design, Construction and Testing at the Time of Manufacture.

Users should note that this standard shall not be used for linerless cylinders manufactured from two or more parts joined together, see 7.1.2.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Bouteilles à gaz — Conception, construction et essais des tubes et bouteilles à gaz rechargeables en matériau composite —

Partie 3: Tubes et bouteilles à gaz entièrement bobinés en matériau composite renforcés de fibres d'une contenance allant jusqu'à 450 l avec liners non métalliques ou métalliques non structuraux, ou sans liners

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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 third edition cancels and replaces the second edition (ISO 11119-3:2013), which has been technically revised. The main changes compared to the previous edition are as follows:

- References updated.
- [7.1.4](#) Minimum fibre stress ratios added.
- [8.5.9](#) Drop/impact test. Addition of new alternative test for cylinders up to and including 50 l water capacity with dedicated compressed gas service. Addition of alternative impact test for tubes 150 l and above.
- [8.5.11](#) 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.
- [8.5.12](#) Torque test is now only required for taper threads.
- References updated
- [8.5.16](#) Pneumatic cycle test. New procedure for the test to have a lower number of cycles but, with a significant hold time at pressure.

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

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^[2].

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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 4 composite fully wrapped cylinders or tubes with a non-load sharing liner and composite reinforcement on both the cylindrical portion and the dome ends;
- type 5 fully wrapped cylinders or tubes without liners and with a test pressure of less than 60 bar and composite reinforcement on both the cylindrical portion and the dome ends;
- water capacities up to 450 l;
- for 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;
- a minimum design life of 15 years.

Cylinders and tubes manufactured and tested according to this document are not intended to contain toxic, oxidizing or corrosive gases.

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 527-1, *Plastics — Determination of tensile properties — Part 1: General principles*

ISO 527-2, *Plastics — Determination of tensile properties — Part 2: Test conditions for moulding and extrusion plastics*

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*