

This is a preview of "BS ISO 11513:2019". [Click here to purchase the full version from the ANSI store.](#)



BSI Standards Publication

Gas cylinders — Refillable welded steel cylinders containing materials for sub-atmospheric gas packaging (excluding acetylene) — Design, construction, testing, use and periodic inspection

This is a preview of "BS ISO 11513:2019". [Click here to purchase the full version from the ANSI store.](#)

National foreword

This British Standard is the UK implementation of ISO 11513:2019. It supersedes BS ISO 11513:2011, which is withdrawn.

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.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2019
Published by BSI Standards Limited 2019

ISBN 978 0 580 98763 2

ICS 23.020.35

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 June 2019.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

This is a preview of "BS ISO 11513:2019". [Click here to purchase the full version from the ANSI store.](#)

Second edition
2019-06-20

Gas cylinders — Refillable welded steel cylinders containing materials for sub-atmospheric gas packaging (excluding acetylene) — Design, construction, testing, use and periodic inspection

Bouteilles à gaz — Bouteilles en acier soudées rechargeables contenant des matériaux pour le stockage des gaz à une pression sub-atmosphérique (à l'exclusion de l'acétylène) — Conception, fabrication, essais, utilisation et contrôle périodique



Reference number
ISO 11513:2019(E)

© ISO 2019

This is a preview of "BS ISO 11513:2019". [Click here to purchase the full version from the ANSI store.](#)



COPYRIGHT PROTECTED DOCUMENT

© ISO 2019, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

This is a preview of "BS ISO 11513:2019". Click here to purchase the full version from the ANSI store.

Contents

Page

Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms, definitions and symbols	2
3.1 Terms and definitions.....	2
3.2 Symbols.....	2
4 Inspection and testing	3
5 Materials and stress relieving	3
6 Design	4
6.1 General.....	4
6.2 Calculation of cylindrical wall thickness.....	5
6.3 Design of cylinder ends.....	5
6.3.1 General.....	5
6.3.2 Design of base concave to pressure.....	5
6.4 Minimum wall thickness.....	6
6.5 Pressure relief device.....	7
7 Construction and workmanship	7
7.1 General.....	7
7.2 Welding qualification.....	7
7.3 Welding seams of pressure containing parts.....	8
7.4 Valve protection.....	8
7.5 Boss threads.....	8
7.6 Visual examination.....	8
7.6.1 Imperfections.....	8
7.6.2 Welds.....	8
7.6.3 Out-of-roundness.....	10
7.6.4 Straightness.....	11
7.6.5 Verticality.....	11
8 Technical requirements for type approval testing (new design tests)	11
8.1 General.....	11
8.2 Verifications and tests.....	12
8.3 Description of verification tests.....	12
8.3.1 Hydraulic burst test.....	12
8.3.2 Pressure cycling test.....	13
9 Batch tests	13
9.1 General.....	13
9.2 Information.....	13
9.3 Checks and verifications.....	14
9.4 Tensile test.....	14
9.4.1 General.....	14
9.4.2 Tensile test samples required from parent material.....	14
9.4.3 Tensile test samples required from welds.....	14
9.5 Bend test.....	16
9.6 Macroscopic examination of weld cross-sections.....	16
9.7 Radiographic examination of welds.....	16
10 Tests on every cylinder	17
11 Failure to meet verification and test requirements	17
12 Marking	17

This is a preview of "BS ISO 11513:2019". [Click here to purchase the full version from the ANSI store.](#)

13	Certification	18
Annex A (normative)	Inspection at time of fill	19
Annex B (normative)	Periodic inspection and test	21
Bibliography		22

This is a preview of "BS ISO 11513:2019". [Click here to purchase the full version from the ANSI store.](#)

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*.

This second edition cancels and replaces the first edition (ISO 11513:2011), which has been technically revised. The main changes compared to the previous edition are as follows:

- references to packing instruction P200 of the UN Model Regulations have been replaced with packing instruction P208 as this document is referenced in only P208 of the UN Model Regulations;
- the prohibition on the use of ultrasonic testing during periodic inspection and test has been removed from [Annex B](#);
- the unit “weight” has been replaced with “mass” to align with ISO 80000.

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 is a preview of "BS ISO 11513:2019". [Click here to purchase the full version from the ANSI store.](#)

Introduction

This document provides a specification for the design, manufacture, use and periodic inspection and testing of a welded steel cylinder necessary to facilitate sub-atmospheric pressure gas packaging technology on a worldwide basis. The specifications given are based on knowledge of, and experience with, materials, design requirements, manufacturing processes and control at manufacture of cylinders in common use in the countries of the ISO member bodies.

The pressure shell of the cylinder is fabricated by manufacturing a cylindrical shape with a base and welding a machined plug (boss) or semi-ellipsoidal or torispherical shape onto the open end of the shell to form the cylinder. This method of fabrication allows for insertion of material prior to sealing the cylinder.

A further objective of this document is to balance design and economic efficiency against international acceptance and universal utility. It aims to eliminate the concerns about climate, duplicate inspections and restrictions currently existing because of lack of definitive International Standards.

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

This is a preview of "BS ISO 11513:2019". [Click here to purchase the full version from the ANSI store.](#)

Gas cylinders — Refillable welded steel cylinders containing materials for sub-atmospheric gas packaging (excluding acetylene) — Design, construction, testing, use and periodic inspection

1 Scope

This document specifies minimum requirements for the material, design, construction, workmanship, examination and testing at manufacture of refillable welded steel cylinders for the sub-atmospheric pressure storage of liquefied and compressed gases. It only applies to the cylinders themselves, irrespective of the materials contained therein (e.g. adsorbents, media, materials and/or gases) and other related applications. The cylinders have a test pressure not greater than 42 bar and a water capacity from 0,5 l up to and including 12 l exposed to ambient temperatures for the purpose of facilitating the sub-atmospheric pressure storage of liquefied and compressed gases as adsorbed gases.

Minimum requirements for inspection at the time of fill and periodic inspection and testing are also specified.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitute 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 4136, *Destructive tests on welds in metallic materials — Transverse tensile test*

ISO 4978, *Steel sheet and strip for welded gas cylinders*

ISO 5817, *Welding — Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) — Quality levels for imperfections*

ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature*

ISO 7438, *Metallic materials — Bend test*

ISO 9809-3:2010, *Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 3: Normalized steel cylinders*

ISO 10286, *Gas cylinders — Terminology*

ISO 11117, *Gas cylinders — Valve protection caps and valve guards — Design, construction and tests*

ISO 13769, *Gas cylinders — Stamp marking*

ISO 15614-1, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys*

ISO 17636-1, *Non-destructive testing of welds — Radiographic testing — Part 1: X- and gamma-ray techniques with film*

ISO 17637, *Non-destructive testing of welds — Visual testing of fusion-welded joints*

ISO 17639, *Destructive tests on welds in metallic materials — Macroscopic and microscopic examination of welds*