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**Gas cylinders — Cylinder bundles
— Design, manufacture, testing and
inspection**

*Bouteilles à gaz — Cadres de bouteilles — Conception, fabrication,
essais et inspection*



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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 4, *Operational requirements of gas cylinders*.

This third edition cancels and replaces the second edition (ISO 10961:2010), which has been technically revised.

The main changes compared to the previous edition are as follows:

- the terminology was brought in line with ISO 10286, as far as possible,
- storage was added throughout the document as a possible use case,
- the descriptions of the drop tests were clarified,
- the descriptions of the leak tests were clarified,
- a new figure was added showing the angle for the vertical drop test,
- the rotating drop test has been differentiated by whether the bundle is fitted with cylinders vertically or horizontally,
- the additional requirements for acetylene cylinder bundles were clarified,
- the information for the bundle identification for filling was moved to [Annex C](#).

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 <https://www.iso.org/members.html>.

Introduction

For some applications, the contents of an individual gas cylinder might not satisfy the gas demand, in which case assemblies of cylinders can be used to supply larger volumes of gas in a single unit. The single unit, which contains a number of cylinders, is known as a cylinder bundle.

Such a cylinder bundle is a portable assembly, designed to be routinely lifted, that consists of a frame and two or more cylinders connected to a manifold by cylinder valves or fittings so that the cylinders can be filled, transported and emptied without disassembly.

A cylinder bundle can be subjected to rough handling in the course of normal operations.

There are types of gas cylinder assemblies that use cylinder bundle components but are designed to be disassembled at each filling to enable the cylinders to be filled individually. Although these assemblies do not conform to the basic definition of a cylinder bundle, they are commonly referred to as bundles. Their special requirements are provided in [Annex A](#).

Acetylene cylinder bundles are often filled without disassembly. The confirmation of solvent content can be achieved with or without disassembling the bundle. Replenishing of solvent is usually done after a defined number of fillings. Their special requirements are provided in [Annex B](#).

In International Standards, weight is equivalent to a force, expressed in Newton. However, in common parlance (as used in terms defined in this document), the word “weight” continues to be used to mean “mass”, but this practice is deprecated (see ISO 80000-4).

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

Gas cylinders — Cylinder bundles — Design, manufacture, testing and inspection

1 Scope

This document specifies the requirements for the design, construction, testing and initial inspection of a transportable cylinder bundle.

It is applicable to cylinder bundles containing cylinders containing compressed gas, liquefied gas and mixtures thereof. It is also applicable to cylinder bundles for acetylene. Additional requirements for acetylene cylinder bundles containing acetylene in a solvent are provided in [Annex B](#). This document does not, however, cover acetylene cylinder bundles with solvent-free acetylene cylinders.

This document specifies the additional requirements that apply when individual cylinders are assembled into a bundle. Unless otherwise stated, individual cylinders within a cylinder bundle conform to applicable standards for single cylinders.

This document is intended primarily for industrial gases other than liquefied petroleum gas (LPG), but it can also be used for LPG.

This document does not apply to packages in which cylinders are manifolded together in a frame that is designed to be fixed permanently to a road vehicle, to a railway wagon or to the ground as a customer storage vessel. It also does not apply to cylinder bundles that are designed for use in extreme environmental or operational conditions (e.g. offshore cylinder bundles) when additional and extraordinary requirements are imposed to maintain safety standards, reliability and performance.

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 3807, *Gas cylinders — Acetylene cylinders — Basic requirements and type testing*

ISO 9606-1, *Qualification testing of welders — Fusion welding — Part 1: Steels*

ISO 10297, *Gas cylinders — Cylinder valves — Specification and type testing*

ISO 10286:2015, *Gas cylinders — Terminology*

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

ISO 11114-2, *Gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 2: Non-metallic materials*

ISO 13585, *Brazing — Qualification test of brazers and brazing operators*

ISO 14113, *Gas welding equipment — Rubber and plastics hose and hose assemblies for use with industrial gases up to 450 bar (45 MPa)*

ISO 15607, *Specification and qualification of welding procedures for metallic materials — General rules*

ISO 15615:2013, *Gas welding equipment — Acetylene manifold systems for welding, cutting and allied processes — Safety requirements in high-pressure devices*