
**Gas cylinders — Compatibility of cylinder
and valve materials with gas contents —**

**Part 1:
Metallic materials**

*Bouteilles à gaz — Compatibilité des matériaux des bouteilles et des
robinets avec les contenus gazeux —*

Partie 1: Matériaux métalliques



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Published in Switzerland

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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 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 11114-1 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 23, *Transportable gas cylinders*, in collaboration with ISO Technical Committee ISO/TC 58, *Gas cylinders*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 11114-1:1997), which has been technically revised. The main changes resulting from the revision of this part of ISO 11114 are

- the term “not recommended” has been replaced by “not acceptable”,
- the text has been clarified,
- a requirement for gas mixtures has been introduced.

ISO 11114 consists of the following parts, under the general title *Gas cylinders — Compatibility of cylinder and valve materials with gas contents*:

- *Part 1: Metallic materials*
- *Part 2: Non-metallic materials*
- *Part 3: Autogenous ignition test for non-metallic materials in oxygen atmosphere*
- *Part 4: Test methods for selecting metallic materials resistant to hydrogen embrittlement*

Introduction

Industrial, medical and special gases (e.g. high-purity gases, calibration gases) can be transported or stored in gas cylinders. An essential requirement of the material from which such gas cylinders and their valves are manufactured is compatibility with the gas content.

Compatibility of cylinder materials with gas content has been established over many years by practical application and experience. Existing national and international regulations and standards do not fully cover this aspect.

This part of ISO 11114 is based on current international experience and knowledge.

Where there is any conflict between this International Standard and any applicable regulation, the regulation always takes precedence.

This part of ISO 11114 has been written to be in conformity with the UN Recommendations on the Transport of Dangerous Goods: Model Regulations. When published it will be submitted to the UN Sub Committee of Experts on the Transport of Dangerous Goods with a request that it be included in the Model Regulations.

Gas cylinders — Compatibility of cylinder and valve materials with gas contents —

Part 1: Metallic materials

1 Scope

This part of ISO 11114 provides requirements for the selection of safe combinations of metallic cylinder and valve materials and cylinder gas content.

The compatibility data given is related to single gases and to gas mixtures.

Seamless metallic, welded metallic and composite gas cylinders and their valves, used to contain compressed, liquefied and dissolved gases, are considered.

NOTE In this part of ISO 11114 the term “cylinder” refers to transportable pressure receptacles, which also include tubes and pressure drums.

Aspects such as the quality of delivered gas product are not considered.

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 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 10156, *Gases and gas mixtures — Determination of fire potential and oxidizing ability for the selection of cylinder valve outlets*

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

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

ISO 11114-3, *Gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 3: Autogenous ignition test for non-metallic materials in oxygen atmosphere*

ISO 11120, *Gas cylinders — Refillable seamless steel tubes for compressed gas transport of water capacity between 150 l and 3 000 l — Design, construction and testing*