

SVENSK STANDARD

SS-EN ISO 11114-2:2013

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Gasflaskor – Kompatibilitet mellan material i gasflaska respektive ventil med gasinnehåll – Del 2: Icke metalliska material (ISO 11114-2:2013)

Gas cylinders – Compatibility of cylinder and valve materials with gas contents – Part 2: Non-metallic materials (ISO 11114-2:2013)



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Europastandarden EN ISO 11114-2:2013 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN ISO 11114-2:2013.

Denna standard ersätter SS-EN ISO 11114-2, utgåva 1.

The European Standard EN ISO 11114-2:2013 has the status of a Swedish Standard. This document contains the official version of EN ISO 11114-2:2013.

This standard supersedes the Swedish Standard SS-EN ISO 11114-2, edition 1.

**Förhållandet till övriga delar under samma huvudtitel - Utdrag ur Förord i ISO 11114-2:2013/
Relations to other parts under the same general title - Extract from the Foreword of
ISO 11114-2:2013**

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.*

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Denna standard är framtagen av kommittén för Gasflaskor, SIS/TK 296.

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 11114-2

April 2013

ICS 23.020.30

Supersedes EN ISO 11114-2:2000

English Version

**Gas cylinders - Compatibility of cylinder and valve materials with
gas contents - Part 2: Non-metallic materials (ISO 11114-
2:2013)**

Bouteilles à gaz - Compatibilité des matériaux des
bouteilles et des robinets avec les contenus gazeux - Partie
2: Matériaux non métalliques (ISO 11114-2:2013)

Gasflaschen - Verträglichkeit von Flaschen- und
Ventilwerkstoffen mit den in Berührung kommenden Gasen
- Teil 2: Nichtmetallische Werkstoffe (ISO 11114-2:2013)

This European Standard was approved by CEN on 9 February 2013.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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Foreword

This document (EN ISO 11114-2:2013) has been prepared by Technical Committee ISO/TC 58 "Gas cylinders" in collaboration with Technical Committee CEN/TC 23 "Transportable gas cylinders" the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2013, and conflicting national standards shall be withdrawn at the latest by October 2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 11114-2:2000.

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Endorsement notice

The text of ISO 11114-2:2013 has been approved by CEN as EN ISO 11114-2:2013 without any modification.

Introduction

This part of ISO 11114 deals with the compatibility of non-metallic materials used for gas cylinders and gas cylinder valves with the gas contents of the cylinder. Compatibility of metallic materials is treated in ISO 11114-1.

Non-metallic materials are very often used for the construction of gas cylinder valves as seals, e.g. o-ring, gland packing, seats, or as lubrication products to avoid friction. They are also commonly used to ensure sealing of the valve/cylinder connection. For gas cylinders, they are sometimes used as an internal coating or as a liner for composite materials.

Non-metallic materials not in contact with the gas are not covered by this part of ISO 11114.

This part of ISO 11114 is based on current international experience and knowledge. Some data are derived from experience involving a mixture of the gas concerned with a dilutant, where no data for single component gases were available.

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. Where there is any conflict between this part of ISO 11114 and any applicable regulation, the regulation always takes precedence.

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

Part 2: Non-metallic materials

1 Scope

This part of ISO 11114 gives guidance in the selection and evaluation of compatibility between non-metallic materials for gas cylinders and valves and the gas contents. It also covers bundles, tubes and pressure drums.

This part of ISO 11114 can be helpful for composite and laminated materials used for gas cylinders.

It does not cover the subject completely and is intended to give guidance only in evaluating the compatibility of gas/material combinations.

Only the influence of the gas in changing the material and mechanical properties is considered (for example chemical reaction or change in physical state). The basic properties of the materials, such as mechanical properties, required for design purposes are normally available from the materials supplier and are not considered in this part of ISO 11114.

The compatibility data given are related to single component gases but can be used to some extent for gas mixtures. Ceramics, glasses, and adhesives are not covered by this part of ISO 11114.

Other aspects such as quality of delivered gas are not considered.

This part of ISO 11114 is not intended to be used for cryogenic fluids (see ISO 21010).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

ISO 10297, *Gas cylinders — Refillable gas cylinder valves — Specification and type testing*

ISO 15001, *Anaesthetic and respiratory equipment — Compatibility with oxygen*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

SS-EN ISO 11114-2:2013 (E)

3.1 competent person
person who has the necessary technical knowledge, qualification, experience and authority to assess and approve materials for use with gases and to define any special conditions of use that are necessary

3.2 acceptable
material/gas combination that is satisfactory under normal conditions of use (as defined in Clause 5), provided that any indicated non-compatibility risks, as given in Table 1, are taken into account

3.3 not acceptable
material/single gas combination that is not safe under normal conditions of use (as defined in Clause 5)

NOTE For gas mixtures special conditions can apply.

3.4 dynamic sealing
where in normal operation the non-metallic material is used to provide a pressure seal between two surfaces that have relative motion to each other

3.5 static sealing
where in normal operation the non-metallic material is used to provide a pressure seal between two surfaces that have not relative motion to each other

4 Materials

4.1 General

Non-metallic materials shall be suitable for the intended service. They are suitable if their compatibility is stated as acceptable in Table 1, or the necessary properties have been proved by tests or long and safe experience to the satisfaction of a competent person.

If coated materials are used the suitability of the combination shall be assessed and approved if all technical aspects have been considered and validated by a competent person. These technical aspects include but are not limited to compatibility of the coating material with the intended gas, durability of the coating during all its intended use and gas permeability through it.

4.2 Types of material

The most commonly used non-metallic materials for gas cylinders and cylinder valves can be grouped as follows:

- plastics;
- elastomers;
- fluid lubricants.

NOTE Solid lubricants are sometimes used, e.g. MoS₂.

Materials considered in this part of ISO 11114 are as follows:

- a) Plastics:
 - Polytetrafluoroethylene (PTFE);

- Polychlorotrifluoroethylene (PCTFE);
- Polyvinylidene fluoride (PVDF);
- Polyamide (PA);
- Polypropylene (PP);
- Polyetheretherketone (PEEK);
- Polypropylene sulphide (PPS);
- Polyvinyl chloride (PVC)
- Polyimide (PI);
- Polyoxymethylene (POM).

b) Elastomers:

- Butyl rubber (IIR);
- Nitrile rubber (NBR);
- Chloroprene rubber (CR);
- Fluorocarbon rubber (FKM);
- Methyl-vinyl-silicone rubber (VMQ);
- Ethylene propylene diene monomer (EPDM);
- Polyacrylate rubber (ACM);
- Polyurethane rubber (PUR);
- Methyl-fluoro-silicone rubber (FVMQ).

c) Fluid lubricants:

- Hydrocarbon (HC);
- Fluorocarbon (FC).

5 General considerations

It is important to note that these materials are generic types. Within each material type there are variations in the properties of the materials due to polymer differences and formulations used by manufacturers to modify physical and chemical properties of the material. The user of the material should therefore consult the manufacturer and if necessary carry out tests before using the material (for example for critical services such as oxygen and other oxidizing gases).

Lubricants are often used in valves to reduce friction and wear in the moving parts. For valves used for oxidizing gases or for gases supporting combustion, if lubrication is required, it shall be ensured that the lubricant is compatible for the intended application when the lubricated components are in contact with the oxidizing gas or the gas supporting combustion.