SLOVENSKI STANDARD
SIST EN ISO 11114-4:2017

01-julij-2017

Nadomešča:
SIST EN ISO 11114-4:2005

Premične plinske jeklenke - Združljivost materialov za ventil in jeklenko s plinom - 4. del: Preskusne metode za izbiro jekel, odpornih proti vodikovi krhkosti (ISO 11114-4:2017)

Transportable gas cylinders - Compatibility of cylinder and valve materials with gas contents - Part 4: Test methods for selecting steels resistant to hydrogen embrittlement (ISO 11114-4:2017)

Ortsbewegliche Gasflaschen - Verträglichkeit von Werkstoffen für Gasflaschen und Ventile mit den in Berührung kommenden Gasen - Teil 4: Prüfverfahren zur Auswahl von Stählen, die gegen Wasserstoffversprödung unempfindlich sind (ISO 11114-4:2017)

Bouteilles à gaz transportables - Compatibilité des matériaux et des robinets avec les contenus gazeux - Partie 4: Méthodes d'essai pour le choix des aciers résistants à la fragilisation par l'hydrogène (ISO 11114-4:2017)

Ta slovenski standard je istoveten z: **EN ISO 11114-4:2017**

ICS:

23.020.35	Plinske jeklenke	Gas cylinders
23.060.40	Tlačni regulatorji	Pressure regulators

SIST EN ISO 11114-4:2017 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 11114-4

April 2017

ICS 23.020.35

Supersedes EN ISO 11114-4:2005

English Version

Transportable gas cylinders - Compatibility of cylinder and valve materials with gas contents - Part 4: Test methods for selecting steels resistant to hydrogen embrittlement (ISO 11114-4:2017)

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This European Standard was approved by CEN on 8 December 2016.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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European foreword

This document (EN ISO 11114-4:2017) 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of an identical text or by endorsement, at the latest by October 2017, and conflicting national standards shall be withdrawn at the latest by October 2017.

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 11114-4:2005.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

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Endorsement notice

The text of ISO 11114-4:2017 has been approved by CEN as EN ISO 11114-4:2017 without any modification.

INTERNATIONAL STANDARD

ISO 11114-4

Second edition
2017-04

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

Part 4: Test methods for selecting steels resistant to hydrogen embrittlement

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

Partie 4: Méthodes d'essai pour le choix des aciers résistants à la fragilisation par l'hydrogène

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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).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/TC 58, *Gas cylinders*.

This second edition cancels and replaces the first edition (ISO 11114-4:2005), which has been technically revised with the following changes:

— improvement of the procedure corresponding to Method C and adjustment of acceptance criteria;

— light modifications on procedures corresponding to Method A and Method B.

A list of parts in the ISO 11114 series can be found on the ISO website.

Introduction

It is widely recognized that compressed hydrogen and some hydrogen bearing gases can have an embrittling effect on steels. This embrittling effect has resulted in the failure of hydrogen gas cylinders (including some bursts) that has led gas cylinder users and manufacturers to adopt specific measures.

The adoption of these measures has eliminated all known failures of hydrogen cylinders from this embrittlement phenomenon as far has been reported.

The basic recommendation is to limit the tensile strength of the steels (see ISO 11114-1) and eliminate manufacturing defects.

This tensile strength limit of 950 MPa was developed for quenched and tempered gas cylinders of 34 Cr Mo 4 type steels using steelmaking practices, chemistry and manufacturing techniques typical of those used during the early 1980's and successfully used for filling pressures up to 300 bar. This practice has been in widescale use up to the current time. Other higher pressures, although at lower tensile strength limits, have also been used.

In recent years, improvements in steelmaking, e.g. by reducing the sulphur and phosphorus contents, have indicated the possibility of increasing the tensile strength limit of 950 MPa for embrittling gas service. Experimental work has shown that the relevant parameters affecting hydrogen embrittlement are the following:

a) microstructure resulting from the combination of the chemistry and the heat treatment;

b) mechanical properties of the material;

c) applied stress;

d) internal surface imperfections resulting in local stress concentrations;

e) characteristics of the gas contained (composition, quality, pressure, etc.).

When developing this document, only the material aspects, a) and b) and the characteristics of the gas e) above, were considered. Other essential features, c) and d), are covered by the relevant parts of ISO 9809.

Some low alloy steels other than 34 Cr Mo 4 may require tensile strength to be lower than 950 MPa, or may be permitted to be higher than 950 MPa, to be suitable for the manufacture of gas cylinders for embrittling gas service.

This document specifies test methods to identify steels which, when combined with the cylinder manufacturing requirements specified in ISO 9809 (all parts), will result in cylinders suitable for use in embrittling gas service.

These tests have been developed following an extensive world-wide programme which incorporated laboratory and full scale tests. See also AFNOR FD E29-753.