Transportable gas cylinders - Refillable welded steel gas cylinders - Design and construction - Part 1: Carbon steel

Transportable gas cylinders - Refillable welded steel gas cylinders - Design and construction - Part 1: Carbon steel

EESTI STANDARDI EESSÕNA **NATIONAL FOREWORD**

Käesolev Eesti standard EVS-EN 13322-1:2003 sisaldab Euroopa standardi EN 13322-1:2003 ingliskeelset teksti. Käesolev dokument on jõustatud 15.04.2003 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes. Standard on kättesaadav Eesti standardiorganisatsioonist.	This Estonian standard EVS-EN 13322-1:2003 consists of the English text of the European standard EN 13322-1:2003. This document is endorsed on 15.04.2003 with the notification being published in the official publication of the Estonian national standardisation organisation. The standard is available from Estonian standardisation organisation.

Käsitlusala: This European Standard sets out minimum requirements concerning material, design, construction and workmanship, manufacturing processes and testing of refillable transportable welded carbon steel gas cylinders of water capacities from 0,5 l up to and including 150 l for compressed, liquefied and dissolved gases	**Scope:** This European Standard sets out minimum requirements concerning material, design, construction and workmanship, manufacturing processes and testing of refillable transportable welded carbon steel gas cylinders of water capacities from 0,5 l up to and including 150 l for compressed, liquefied and dissolved gases

ICS 23.020.30

Võtmesõnad: definition, definitions, design, gas cylinders, gas pressure vessels, heat treatment, marking, materials, materials specification, pressure vessels, production, specification (approval), specifications, steel cylinders, steel vessel, symbols, welded

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 13322-1

March 2003

ICS 23.020.30

English version

Transportable gas cylinders - Refillable welded steel gas cylinders - Design and construction - Part 1: Carbon steel

Bouteilles à gaz transportables - Bouteilles à gaz rechargeables soudées en acier - Conception et construction - Partie 1: Acier au carbone

Ortsbewegliche Gasflaschen - Wiederbefüllbare geschweißte Flaschen aus Stahl - Gestaltung und Konstruktion - Teil 1: Flaschen aus Kohlenstoffstahl

This European Standard was approved by CEN on 28 November 2002.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovak Republic, Spain, Sweden, Switzerland and United Kingdom.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 13322-1:2003 E

Contents

Foreword

This document (EN 13322-1:2003) has been prepared by 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 September 2003, and conflicting national standards shall be withdrawn at the latest by September 2003.

This European Standard has been submitted for reference into the RID and/or in the technical annexes of the ADR. Therefore in this context the standards listed in the normative references and covering basic requirements of the RID/ADR not addressed within the present standard are normative only when the standards themselves are referred to in the RID and/or in the technical annexes of the ADR.

For relationships with EC directives, RID and ADR see informative annex E, which is an integral part of this document.

This standard is one of a series of two standards concerning refillable welded steel gas cylinders of water capacities from 0,5 l up to and including 150 l for compressed, liquefied and dissolved gases:

Part 1: Carbon steel

Part 2: Stainless steel

Annexes A, B and C are normative. Annexes D and E are informative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovak Republic, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

The purpose of this European Standard is to provide a specification for the design, manufacture, and testing of refillable, transportable, welded steel gas cylinders.

The specifications given are based on knowledge of, and experience with, materials, design requirements, manufacturing processes and control during manufacture, of cylinders in common use in the countries of the CEN members.

This standard is based on the traditional calculation method. It does not cover other methods such as finite element analysis (F.E.A) methods or experimental methods.

1 Scope

This European Standard specifies minimum requirements concerning material, design, construction and workmanship, manufacturing processes and testing of refillable transportable welded carbon steel gas cylinders of water capacities from 0,5 l up to and including 150 l for compressed, liquefied and dissolved gases.

For acetylene service, additional requirements for the cylinder and the basic requirements for the porous mass are given in EN 1800. For those cylinders made from high frequency induction (HFI) welded steel tubes, the requirements are given in annex A.

This standard is primarily for industrial gases other than LPG but may also be applied for LPG. However for dedicated LPG cylinders, see EN 1442, *Transportable refillable welded steel cylinders for liquefied petroleum gas (LPG) - Design and construction* prepared by CEN/TC 286 *Liquefied petroleum gas equipment and accessories*.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 287-1, *Approval testing of welders - Fusion welding - Part 1: Steels.*

EN 288-1, *Specification and qualification of welding procedures for metallic materials - Part 1: General rules for fusion welding.*

EN 288-3, *Specification and approval of welding procedures for metallic materials - Part 3: Welding procedure tests for the arc welding of steels.*

EN 473, *Non destructive testing - Qualification and certification of NDT personnel - General principles.*

EN 962, *Transportable gas cylinders - Valve protection caps and valve guards for industrial and medical gas cylinders - Design, construction and tests.*

EN 970, *Non-destructive examination of fusion welds - Visual examination.*

EN 1089-1, *Transportable gas cylinders - Gas cylinder identification (excluding LPG) - Part 1: Stampmarking.*

EN 1435, *Non-destructive examination of welds - Radiographic examination of welded joints.*

EN 1442, *Transportable refillable welded steel cylinders for liquefied petroleum gas (LPG) - Design and construction.*

EN 1964-1:1999, *Transportable gas cylinders - Specification for the design and construction of refillable transportable seamless steel gas cylinders of water capacities from 0,5 litre up to and including 150 litres - Part 1: Cylinders made of seamless steel with an R_m value of less than 1100 MPa.*

EN 10002-1, *Metallic materials - Tensile testing - Part 1: Method of test at ambient temperature.*

EN 10028-1, *Flat products made of steels for pressure purposes - Part 1: General requirements.*

EN 10028-3, *Flat products made of steels for pressure purposes - Part 3: Weldable fine grain steels, normalized.*

EN 10028-5, *Flat products made of steels for pressure purposes - Part 5: Weldable fine grain steels, thermomechanically rolled.*

EN 10045-1, *Metallic materials - Charpy impact test - Part 1: Test method.*

EN 10083-1 + A1, *Quenched and tempered steels - Part 1: Technical delivery conditions for special steels (includes amendment A1:1996)*

EN 10120, *Steel sheet and strip for welded gas cylinders*.

EN 10208-2, *Steel pipes for pipelines for combustible fluids - Technical delivery conditions - Part 2: Pipes of requirement class B.*

EN 12517*, Non-destructive examination of welds - Radiographic examination of welded joints - Acceptance levels.*

EN 13445-2, *Unfired pressure vessels - Part 2: Materials.*

EN 25817, *Arc-welded joints in steel - Guidance on quality levels for imperfections (ISO 5817:1992).*

EN ISO 11114-1, *Transportable gas cylinders - Compatibility of cylinder and valve materials with gas contents - Part 1: Metallic materials (ISO 11114-1:1997).*

ISO 2504:1973, *Radiography of welds and vewing conditions for films - Utilization of recommended patterns of image quality indicators (I.Q.I.).*

3 Terms, definitions and symbols

For the purpose of this standard, the following terms, definitions and symbols apply.

3.1 Terms and definitions

3.1.1
yield stress
value corresponding to the lower yield stress, R_{eL}, or 0,92 × the upper yield stress (R_{eH}) or for steels that do not exhibit a defined yield, the 0,2 % proof stress ($R_{p0,2}$)

[EN 10002-1]

3.1.2
normalizing
heat treatment in which a cylinder is heated to a uniform temperature above the upper critical point (AC_3, as defined in EN 10052) of the steel and then cooled in a controlled atmosphere

3.1.3
stress relieving
heat treatment given to the finished cylinder, the object of which is to reduce the residual stresses without altering the metallurgical structure of the steel, by heating to a uniform temperature below the lower critical point (AC_1, as defined in EN 10052) of the steel and cooling in a still atmosphere

3.1.4
batch
quantity of finished cylinders made consecutively during the same or consecutive days to the same design, size and material specifications and from the same material supplier for each pressure containing part on the same automatic welding machines and heat-treated under the same conditions of temperature and duration

NOTE This definition allows different suppliers to be used for the different pressure containing parts within a batch, e.g. one supplier for heads, another for bases.

3.1.5
design stress factor (*F*)
ratio of equivalent wall stress at test pressure (p_h) to guaranteed minimum yield stress (R_e)