

| | | |
|------------|---|--|
| STN | Nevyhrievané tlakové nádoby. Časť 8: Dodatočné požiadavky na tlakové nádoby z hliníka a hliníkových zliatin. | STN EN 13445-8 69 0010 |
|------------|---|--|

Unfired pressure vessels - Part 8: Additional requirements for pressure vessels of aluminium and aluminium alloys

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 12/14

Obsahuje: EN 13445-8:2014

Oznámením tejto normy sa ruší
STN EN 13445-8 (69 0010) z decembra 2009

119888

English Version

Unfired pressure vessels - Part 8: Additional requirements for pressure vessels of aluminium and aluminium alloys

Réceptifs sous pression non soumis à la flamme - Partie 8:
Exigences complémentaires pour les réceptifs sous
pression en aluminium et alliages d'aluminium

Unbefeuerte Druckbehälter - Teil 8: Zusätzliche
Anforderungen an Druckbehälter aus Aluminium und
Aluminiumlegierungen

This European Standard was approved by CEN on 19 August 2014.

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.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

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

Contents

Page

| | |
|---|----|
| Foreword..... | 4 |
| 1 Scope | 6 |
| 2 Normative references | 6 |
| 3 Terms, definitions, symbols and units | 7 |
| 4 General requirements..... | 7 |
| 5 Materials | 7 |
| 5.1 General..... | 7 |
| 5.2 Elongation after fracture | 7 |
| 5.3 Prevention of brittle fracture | 7 |
| 5.4 Lamellar tearing | 8 |
| 5.5 Chemical composition | 8 |
| 5.6 Material grouping system | 8 |
| 6 Design | 9 |
| 6.1 General..... | 9 |
| 6.2 Design temperature and properties | 9 |
| 6.3 Time-independent nominal design stress..... | 9 |
| 6.4 Thick walled, small bore piping for shells | 9 |
| 6.5 Fatigue design..... | 10 |
| 6.6 Lapped joints, joggle joints, permanent backing strips | 10 |
| 6.6.1 General..... | 10 |
| 6.6.2 Lapped joints..... | 10 |
| 6.6.3 Joggle joints..... | 10 |
| 6.6.4 Joints with permanent backing strips | 11 |
| 7 Manufacture..... | 11 |
| 7.1 General..... | 11 |
| 7.2 Materials | 11 |
| 7.3 Welding procedure specification (WPS) | 11 |
| 7.4 Qualification of welding procedure specifications (WPQR)..... | 11 |
| 7.5 Qualification of welders and welding operators..... | 12 |
| 7.6 Joint preparation..... | 12 |
| 7.7 Preheat..... | 12 |
| 7.8 Production test, reference criteria | 12 |
| 7.9 Extent of testing..... | 13 |
| 7.10 Performance of test and acceptance criteria..... | 13 |
| 7.11 Forming procedures..... | 13 |
| 7.12 Heat treatment after forming | 13 |
| 7.13 Sampling of formed products..... | 15 |
| 7.14 Tests..... | 15 |
| 7.14.1 Base material..... | 15 |
| 7.14.2 Butt welds..... | 16 |
| 7.15 Post weld heat treatment (PWHT) | 16 |
| 8 Inspection and testing..... | 16 |
| 8.1 General..... | 16 |
| 8.2 Non-destructive testing of welded joints | 16 |
| 8.2.1 General..... | 16 |
| 8.2.2 Demonstration of satisfactory experience for testing group 2..... | 17 |
| 8.2.3 Symbols | 18 |
| 8.3 Determination of extent of non destructive testing | 18 |
| 8.4 Applicable non destructive testing techniques..... | 21 |
| 8.4.1 NDT methods..... | 21 |
| 8.4.2 Acceptance criteria for radiographic testing (RT)..... | 22 |

| | | |
|--------------|---|----|
| 8.4.3 | Acceptance criteria for visual and surface penetrant testing..... | 22 |
| 8.4.4 | Acceptance criteria for penetrant testing (PT) | 23 |
| 8.5 | Selection of non-destructive testing methods for internal imperfections..... | 23 |
| 8.6 | Standard hydrostatic test | 24 |
| 8.7 | Pneumatic testing..... | 24 |
| 9 | Inspection and testing of serially produced pressure vessels — Model approval..... | 24 |
| 9.1 | General..... | 24 |
| 9.2 | Inspection and testing of pressure vessels subject to cyclic loads | 24 |
| Annex Y | (informative) History of EN 13445-8 | 25 |
| Y.1 | Differences between EN 13445-8:2009 and EN 13445-8:2014 | 25 |
| Annex ZA | (informative) Relationship between this European Standard and the Essential Requirements of the EU Pressure Equipment Directive 97/23/EC | 26 |
| Bibliography | | 27 |

Foreword

This document (EN 13445-8:2014) has been prepared by Technical Committee CEN/TC 54 “Unfired pressure vessels”, 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 December 2014, and conflicting national standards shall be withdrawn at the latest by December 2014.

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 has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative annex ZA, which is an integral part of this document.

This European Standard consists of the following Parts:

- Part 1: *General.*
- Part 2: *Materials.*
- Part 3: *Design.*
- Part 4: *Fabrication.*
- Part 5: *Inspection and testing.*
- Part 6: *Requirements for the design and fabrication of pressure vessels and pressure parts constructed from spheroidal graphite cast iron.*
- CR 13445-7, *Unfired pressure vessels — Part 7: Guidance on the use of conformity assessment procedures.*
- Part 8: *Additional requirements for pressure vessels of aluminium and aluminium alloys.*
- CEN/TR 13445-9, *Unfired pressure vessels — Part 9: Conformance of EN 13445 series to ISO 16528*

Although these Parts may be obtained separately, it should be recognised that the Parts are inter-dependant. As such the manufacture of unfired pressure vessels requires the application of all the relevant Parts in order for the requirements of the Standard to be satisfactorily fulfilled.

Corrections to the standard interpretations where several options seem possible are conducted through the Migration Help Desk (MHD). Information related to the Help Desk can be found at <http://www.unm.fr/en13445@unm.fr>. A form for submitting questions can be downloaded from the link to the MHD website. After subject experts have agreed an answer, the answer will be communicated to the questioner. Corrected pages will be given specific issue number and issued by CEN according to CEN Rules. Interpretation sheets will be posted on the website of the MHD.

This document supersedes EN 13445-8:2009. This new edition incorporates the Amendments which have been approved previously by CEN members, and the corrected pages up to Issue 5 without any further technical change. Annex Y provides details of significant technical changes between this European Standard and the previous edition.

Amendments to this new edition may be issued from time to time and then used immediately as alternatives to rules contained herein. It is intended to deliver a new Issue of EN 13445:2014 each year, starting with the present document as Issue 1, consolidating these Amendments and including other identified corrections.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard specifies requirements for unfired pressure vessels and their parts made of aluminium and aluminium alloys in addition to the general requirements for unfired pressure vessels under EN 13445:2014 Parts 1 to 5. This European Standard specifies unfired pressure vessels for loads up to 500 full cycles.

NOTE Cast materials are not included in this version. Details regarding cast materials will be subject to an amendment to or a revision of this European Standard.

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.

EN 573-3:2013, *Aluminium and aluminium alloys — Chemical composition and form of wrought products — Part 3: Chemical composition and form of products*

EN 12392:2000, *Aluminium and aluminium alloys — Wrought products — Special requirements for products intended for the production of pressure equipment*

EN 13445-1:2014, *Unfired pressure vessels — Part 1: General*

EN 13445-2:2014, *Unfired pressure vessels — Part 2: Materials*

EN 13445-3:2014, *Unfired pressure vessels — Part 3: Design*

EN 13445-4:2014, *Unfired pressure vessels — Part 4: Fabrication*

EN 13445-5:2014, *Unfired pressure vessels — Part 5: Inspection and testing*

EN ISO 3452-1:2013, *Non-destructive testing — Penetrant testing — Part 1: General principles* (ISO 3452-1:2013)

EN ISO 6520-1:2007, *Welding and allied processes — Classification of geometric imperfections in metallic materials — Part 1: Fusion welding* (ISO 6520-1:2007)

EN ISO 9606-2:2004, *Qualification test of welders — Fusion welding — Part 2: Aluminium and aluminium alloys* (ISO 9606-2:2004)

EN ISO 10042:2005, *Welding — Arc-welded joints in aluminium and its alloys — Quality levels for imperfections* (ISO 10042:2005)

EN ISO 11666:2010, *Non-destructive examination of welds — Ultrasonic testing — Acceptance levels* (ISO 11666:2010)

EN ISO 15614-2:2005, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 2: Arc welding of aluminium and its alloys* (ISO 15614-2:2005)

EN ISO 17635:2010, *Non-destructive testing of welds — General rules for metallic materials* (ISO 17635:2010)

EN ISO 17636-1:2013, *Non-destructive testing of welds — Radiographic testing — Part 1: X- and gamma-ray techniques with film* (ISO 17636-1:2013)

EN ISO 17636-2:2013, *Non-destructive testing of welds — Radiographic testing — Part 2: X- and gamma-ray techniques with digital detectors* (ISO 17636-1:2013)

EN ISO 17637:2011, *Non-destructive testing of welds — Visual testing of fusion-welded joints* (ISO 17637:2003)

EN ISO 17640:2010, *Non-destructive testing of welds — Ultrasonic testing — Techniques, testing levels and assessment* (ISO 17640:2010)

EN ISO 23277:2009, *Non-destructive testing of welds — Penetrant testing of welds — Acceptance levels* (ISO 23277:2009)

CEN ISO/TR 15608:2013, *Welding — Guidelines for a metallic materials grouping system* (ISO/TR 15608:2013)

koniec náhľadu – text ďalej pokračuje v platenej verzii STN