

Leekkuumutusega surveanumad. Osa 8: Täiendavad nõuded alumiiniumist või alumiiniumsulamist surveanumatele

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EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<div>E E</div> <div>EVS-EN 13445-8:2009 EN 13445-8:2009</div> <div>S</div> <div>EVS</div> <div>E</div> <div>E</div> <div>22 0 2009</div> <div>S S</div> <div>E</div>	<div>E</div> <div>EVS-EN 13445-8:2009</div> <div>E</div> <div>EN 13445-8:2009</div> <div>E</div> <div>S</div> <div>E</div> <div>22 0 2009</div> <div>S</div> <div>E</div>
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English Version

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

Réceptacles sous pression non soumis à la flamme - Partie 8
: exigences complémentaires pour les réceptacles 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 30 June 2009.

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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 13445-8:2009) 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of an identical text or by endorsement, at the latest by *December 2009*, and conflicting national standards shall be withdrawn at the latest by *December 2009*.

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 EC Directive(s).

For relationship with EC 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*

This document supersedes EN 13445-8:2006. This new edition incorporates the Amendments which have been approved previously by CEN members, and the corrected pages up to Issue 36 without any further technical change. Annex Y to EN 13445-1:2009 and Annex Y to this Part 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 13445:2009 each year, consolidating these Amendments and including other identified corrections. Issue 5 (2013-07) includes the corrected pages listed in Annex Y.

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, 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 Part 8 of 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 13445:2009 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 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.

EN 571-1:1997, *Non-destructive testing — Penetrant testing — Part 1: General principles*

EN 573-3:2007, *Aluminium and aluminium alloys — Chemical composition and form of wrought products — Part 3: Chemical composition*

EN 583-4:2002, *Non-destructive testing — Ultrasonic examination — Part 4: Examination for discontinuities perpendicular to the surface*

EN 970:1997, *Non-destructive examination of fusion welds — Visual examination*

EN 1289:1998, EN 1289:1998/A1:2002, EN 1289:1998/A2:2003, *Non-destructive examination of welds — Penetrant testing of welds — Acceptance levels*

EN 1435:1997, EN 1435:1997/A1:2002, EN 1435:1997/A2:2003, *Non-destructive examination of welds — Radiographic examination of welded joints*

EN 1712:1997, EN 1712:1997/A1:2002, EN 1712:1997/A2:2003, *Non-destructive examination of welds — Ultrasonic examination of welded joints — Acceptance levels*

EN 1714:1997, EN 1714:1997/A1:2002, EN 1714:1997/A2:2003, *Non-destructive examination of welds — Ultrasonic examination of welded joints*

EN 12062:1997, EN 12062:1997/A1:2002, EN 12062:1997/A2:2003, *Non-destructive examination of welds — General rules for metallic materials*

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

EN 13445-1:2009, *Unfired pressure vessels — Part 1: General*

EN 13445-2:2009, *Unfired pressure vessels — Part 2: Materials*

EN 13445-3:2009, *Unfired pressure vessels — Part 3: Design*

EN 13445-4:2009, *Unfired pressure vessels — Part 4: Fabrication*

EN 13445-5:2009, *Unfired pressure vessels — Part 5: Inspection and testing*

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 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)

CR ISO/TR 15608:2000, *Welding — Guidelines for a metallic materials grouping system* (ISO/TR 15608:2000)

3 Terms, definitions, symbols and units

For the purposes of this document, the terms, definitions, symbols and units given in EN 13445:2009 Parts 1 to 5 apply.

NOTE Further symbols are listed in 8.2.3.

4 General requirements

The general requirements of EN 13445-1:2009 shall apply.

5 Materials

5.1 General

The requirements of EN 13445-2:2009 shall apply with the following additions/exclusions.

5.2 Elongation after fracture

NOTE Also see 4.1.4 of EN 13445-2:2009.

Aluminium and aluminium alloys used for welded parts of pressure vessels that are subjected to cold forming (e.g. rolled shells and heads) shall have a specified minimum elongation after fracture measured on a gauge length

$$L_o = 5,65\sqrt{S_o} \quad (5.2-1)$$

that is ≥ 14 % in the longitudinal or transverse direction as defined by the material specification.

Aluminium and aluminium alloys used for parts of pressure vessels that are not subjected to cold forming (e.g. straight flanges and nozzles) shall have a specified minimum elongation after fracture measured on a gauge length

$$L_o = 5,65\sqrt{S_o} \quad (5.2-2)$$

that is ≥ 10 % in the longitudinal or transverse direction as defined by the material specification.

5.3 Prevention of brittle fracture

NOTE 1 Also see 4.1.6 of EN 13445-2:2009.

Annex B of EN 13445-2:2009 is not applicable.

NOTE 2 The requirements of 4.3 of EN 1252-1:1998 should be used for determining the minimum design and temperature and the requirements to prevent brittle fracture.