



Institut luxembourgeois de la normalisation
de l'accréditation, de la sécurité et qualité
des produits et services

ILNAS-EN 13445-2:2014

**Unfired pressure vessels - Part 2:
Materials**

Réipients sous pression non soumis à la
flamme - Partie 2 : matériaux

Unbefeuerte Druckbehälter - Teil 2:
Werkstoffe

09/2014



National Foreword

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Unfired pressure vessels - Part 2: Materials

Réipients sous pression non soumis à la flamme - Partie 2:
Matériaux

Unbefeuerte Druckbehälter - Teil 2: Werkstoffe

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

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Contents

Page

Foreword.....	4
1 Scope	6
2 Normative references	6
3 Terms, definitions, symbols and units	8
3.1 Terms and definitions	8
3.2 Symbols and units	9
4 Requirements for materials to be used for pressure-bearing parts	11
4.1 General.....	11
4.2 Special provisions	13
4.2.1 Special properties.....	13
4.2.2 Design temperature above 20 °C.....	13
4.2.3 Prevention of brittle fracture	14
4.2.4 Design properties in the creep range	14
4.2.5 Specific requirements for steels for fasteners	14
4.3 Technical delivery conditions	15
4.3.1 European Standards.....	15
4.3.2 European Approval for Materials	15
4.3.3 Particular material appraisals.....	15
4.3.4 Clad products.....	15
4.3.5 Welding consumables.....	15
4.4 Marking	15
5 Requirements for materials to be used for non-pressure parts	16
Annex A (normative) Grouping system for steels for pressure equipment.....	17
Annex B (normative) Requirements for prevention of brittle fracture at low temperatures	19
B.1 General.....	19
B.2 Material selection and impact energy requirements	20
B.2.1 Introduction	20
B.2.2 Method 1	20
B.2.3 Method 2	28
B.2.4 Method 3 — Fracture mechanics analysis	40
B.3 General test requirements	41
B.3.1 General.....	41
B.3.2 Sub-sized specimens	42
B.4 Welds	43
B.4.1 General.....	43
B.4.2 Welding procedure qualification	43
B.4.3 Production test plates	43
B.5 Materials for use at elevated temperatures.....	43
B.5.1 General.....	43
B.5.2 Materials	43
B.5.3 Welding procedure qualification and production test plates.....	44
B.5.4 Start up and shut down procedure	44
B.5.5 Pressure test	44
Annex C (informative) Procedure for determination of the weld creep strength reduction factor (WCSRF)	52
Annex D (informative) Technical delivery conditions for clad products for pressure purposes	53
D.1 Introductory note	53
D.2 Requirements for the material	53
D.3 Requirements for the deposited material.....	53
D.4 Qualification of the cladding procedure.....	54

D.5	Production tests	55
Annex E	(informative) European steels for pressure purposes	57
E.1	European Standards for steels and steel components for pressure purposes.....	57
E.2	European standardised steels grouped according to product forms.....	58
Annex Y	(informative) History of EN 13445-2	81
Y.1	Differences between EN 13445-2:2009 and EN 13445-2:2014	81
Y.2	List of corrected pages of Issue 2 (2015-07).....	81
Y.3	List of corrected pages of Issue 3 (2016-07).....	81
Y.4	List of corrected pages of Issue 4 (2017-07).....	81
Y.5	List of corrected pages of Issue 5 (2017-07).....	81
Annex ZA	(informative) Relationship between this European Standard and the essential requirements of Directive 2014/68/EU aimed to be covered	82
Bibliography		83

Foreword

This document (EN 13445-2:2014) 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*
- Part 10: *Additional requirements for pressure vessels of nickel and nickel alloys*

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 13445-2:2009. 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 consolidating these Amendments and including other identified corrections. Issue 5 (2018-07) 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, 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard specifies the requirements for steel products used for unfired pressure vessels.

For some metallic materials other than steel, such as spheroidal graphite cast iron, aluminium, nickel, copper, titanium, requirements are or will be formulated in separate parts of this European Standard.

For metallic materials which are not covered by a harmonized material standard and are not likely to be in near future, specific rules are given in this part or the above cited parts 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 764-1:2004, *Pressure equipment — Terminology — Part 1: Pressure, temperature, volume, nominal size*

EN 764-2:2012, *Pressure equipment — Part 2: Quantities, symbols and units*

EN 764-3:2002, *Pressure equipment — Part 3: Definition of parties involved*

EN 764-4:2014, *Pressure equipment — Part 4: Establishment of technical delivery conditions for metallic materials*

EN 1092-1:2007, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 1: Steel flanges*

EN 10028-2:2009, *Flat products made of steels for pressure purposes — Part 2: Non-alloy and alloy steels with specified elevated temperature properties*

EN 10028-3:2009, *Flat products made of steels for pressure purposes — Part 3: Weldable fine grain steels, normalized*

EN 10028-4:2009, *Flat products made of steels for pressure purposes — Part 4: Nickel alloy steels with specified low temperature properties*

EN 10028-5:2009, *Flat products made of steels for pressure purposes — Part 5: Weldable fine grain steels, thermomechanically rolled*

EN 10028-6:2009, *Flat products made of steels for pressure purposes — Part 6: Weldable fine grain steels, quenched and tempered*

EN 10028-7:2007, *Flat products made of steels for pressure purposes — Part 7: Stainless steels*

EN 10204:2004, *Metallic products — Types of inspection documents*

EN 10216-3:2013, *Seamless steel tubes for pressure purposes — Technical delivery conditions — Part 3: Alloy fine grain steel tubes*

EN 10216-4:2013, *Seamless steel tubes for pressure purposes — Technical delivery conditions — Part 4: Non-alloy and alloy steel tubes with specified low temperature properties*

EN 10217-3:2002, EN10217-3:2002/A1:2005, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 3: Alloy fine grain steel tubes*

EN 10217-4:2002, EN 10217-4:2002/A1:2005, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 4: Electric welded non-alloy steel tubes with specified low temperature properties*

EN 10217-6:2002, EN 10217-6:2002/A1:2005, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 6: Submerged arc welded non-alloy steel tubes with specified low temperature properties*

EN 10222-3:1998, *Steel forgings for pressure purposes — Part 3: Nickel steels with specified low temperature properties*

EN 10222-4:1998, EN 10222-4:1998/A1:2001, *Steel forgings for pressures purposes — Part 4: Weldable fine grain steels with high proof strength*

EN 10269:1999, EN 10269:1999/A1:2006, *Steels and nickel alloys for fasteners with specified elevated and/or low temperature properties*

EN 10273:2007, *Hot rolled weldable steel bars for pressure purposes with specified elevated temperature properties*

EN 12074:2000, *Welding consumables — Quality requirements for manufacture, supply and distribution of consumables for welding and allied processes*

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

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 13479:2004, *Welding consumables — General product standard for filler metals and fluxes for fusion welding of metallic materials*

EN ISO 148-1:2010, *Metallic materials — Charpy pendulum impact test — Part 1: Test method* (ISO 148-1:2010)

EN ISO 204:2009, *Metallic materials — Uniaxial creep testing in tension — Method of test* (ISO 204:2009)

EN ISO 898-1:2013, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 1: Bolts, screws and studs with specified property classes — Coarse thread and fine pitch thread* (ISO 898-1:2013)

EN ISO 898-2:2012, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 2: Nuts with specified property classes — Coarse thread and fine pitch thread* (ISO 898-2:2012)

EN ISO 2566-1:1999, *Steel — Conversion of elongation values — Part 1: Carbon and low alloy steels* (ISO 2566-1:1984)

EN ISO 2566-2:1999, *Steel — Conversion of elongation values — Part 2: Austenitic steels* (ISO 2566-2:1984)

EN ISO 3506-1:2009, *Mechanical properties of corrosion-resistant stainless-steel fasteners — Part 1: Bolts, screws and studs* (ISO 3506-1:2009)

EN ISO 3506-2:2009, *Mechanical properties of corrosion-resistant stainless-steel fasteners — Part 2: Nuts* (ISO 3506-2:2009)

EN ISO 6892-1:2009, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature* (ISO 6892-1:2009)

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