Nederlandse norm

NEN-EN 13445-3/A1

(en)

Unfired pressure vessels - Part 3: Design

Vervangt NEN-EN 13445-3:2002/Ontw. A1:2004

ICS 23.020.30

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Als Nederlandse norm is aanvaard:
- EN 13445-3:2002/A1:2007,IDT

Normcommissie 341 032 "Drukapparatuur"

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 13445-3:2002/A1

June 2007

ICS 23.020.30

English Version

Unfired pressure vessels - Part 3: Design

Récipients sous pression non soumis à la flamme - Partie 3: Conception

Unbefeuerte Druckbehälter - Teil 3: Konstruktion

This amendment A1 modifies the European Standard EN 13445-3:2002; it was approved by CEN on 22 March 2007.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for inclusion of this amendment into the relevant national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This amendment 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 Management Centre has the same status as the official versions.

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Ref. No. EN 13445-3:2002/A1:2007: E

Contents

Page

Foreword

This document (EN 13445-3:2002/A1:2007 - has been prepared by Technical Committee CEN/TC 54 “Unfired pressure vessels”, the secretariat of which is held by BSI.

This Amendment to the European Standard EN 13445-3:2002 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2007, and conflicting national standards shall be withdrawn at the latest by December 2007.

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 97/23/EC.

For relationship with EU Directive 97/23/EC, see informative Annex ZA, which is an integral part of this document.

This amendment is based on EN 13445-3 up to issue 26 (April 2007).

The document includes the text of the amendment itself. The corrected pages of EN 13445-3 will be delivered as issue 27 of the standard.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

2 Normative references

Amend the third reference to read:

EN 764-1:2004, *Pressure equipment – Part 1: Terminology – Pressure, temperature, volume, nominal size.*

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3 Terms and definitions

Add a new definition 3.23:

3.23
creep range
temperature range in which material characteristics used in design are time dependent

Add a NOTE:

NOTE See also 5.1.

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5 Basic design criteria

5.1 General

Replace the existing text with:

Part 3 is applicable only when:

a) materials and welds are not subject to localized corrosion in the presence of products which the vessel is to contain or which can be present in the vessel under reasonably foreseeable conditions.

b) either all calculation temperatures are below the creep range **or** a calculation temperature is in the creep range and time dependent material characteristics are available in the materials standard.

NOTE See definition 3.23 of creep range.

For the purpose of design, the creep range is the temperature range in which time independent material characteristics are no more governing in the determination of the nominal design stress.

The material strength characteristics used shall be related to the specified lifetimes in the various creep load cases

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5.3.3 Failure modes considered in this Part

Add:

f) creep rupture;

g) creep deformation;

h) creep fatigue.

5.4.2 Vessels of all testing groups, pressure loading of predominantly non-cyclic nature

Change the beginning of the first paragraph to:

The DBF requirements specified in Clauses 7 to 16, Annexes G and J and in Clause 19 (**for testing subgroups 1c and 3c only**), and the DBA requirements of Annex B and Annex C provide satisfactory

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5.4.3 Vessels of testing group 4

Change to:

Pressure vessels to testing group 4, as defined in EN 13445-5, are intended for predominantly non-cyclic operation and ***calculation temperatures below the creep range***. They are limited for operation up to 500 full pressure cycles or equivalent full pressure cycles.

NOTE When the number of equivalent full pressure cycles has reached 500, a hydraulic test should be performed and followed by a complete visual examination. If the test is successfully passed, then the operation can be continued for a new 500 cycles period.

Change the heading 5.4.4 to:

5.4.4 Vessels of testing group 1, 2, and 3, working below the creep range, pressure loading of predominantly cyclic nature

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5.7.1 General requirements

Replace the last sentence with:

Specific requirements are included when Design by Analysis – Direct Route of Annex B is used for vessels or vessel parts working in the creep range.

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6 Maximum allowed values of the nominal design stress for pressure parts

In 6.1.1 add the following at the end of the first paragraph:

The values to be used within the creep range are given in Clause 19.

Add the following new clause:

19 Creep design

19.1 Purpose

This clause is for the design of vessels or vessel parts if the calculation temperature is in the creep range. It may be applied for pressure and mechanical loading.

NOTE 1 A definition of the creep range is given in 3.8. See also 5.1b.

NOTE 2 A pre-supposition of the requirements in this clause is usage of sufficiently creep ductile materials. In that regard, the steels and steel castings listed in Table A.2-1 of EN 13445-2:2002 for which, for the relevant temperature range, creep strengths are given in the referred to material standards, are considered to be sufficiently creep ductile.

19.2 Specific definitions

period
duration of a load case with constant loading and constant temperature inside the creep range.

NOTE All individual intervals of time with identical creep conditions (same temperature and same applied loading) occurring separately during the vessel life should be grouped to form a unique period.

single creep load case
case where only one period occurs in the whole lifetime of the vessel.

multiple creep load case
case where more than one period occur in the whole lifetime of the vessel.

lifetime monitoring
requirements for control and examination as stated in the operating instructions with the minimum requirement for continuous recording of pressure and temperature and retention of records.

NOTE See Annex M for guidance.

19.3 Specific symbols and abbreviations

n is the total number of periods of f_{Fi}, T_i.

SF_c is the safety factor for mean creep rupture strength (see 19.5.1 and 19.5.2)

$R_{p1,0/T/t}$ is the mean 1% creep strain limit at calculation temperature T and lifetime t

$R_{m/T/t}$ is the mean creep rupture strength at calculation temperature T and lifetime t

NOTE The creep rupture strengths given in harmonised material standards are always mean values.

T is the calculation temperature in °C

t is the specified lifetime in hours (h) of the pressure vessel (see 19.4)

t_i is the duration (h) of the i-th period, during which the fictitious design stress f_{Fi} acts at the calculation temperature T_i.

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