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Recipientes a presión no sometidos a llama. Parte 3: Diseño. (Ratificada por la Asociación Española de Normalización en septiembre de 2019.)

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Unfired pressure vessels - Part 3: Design (Endorsed by Asociación Española de Normalización in September of 2019.)

Récipients sous pression non soumis à la flamme - Partie 3 : Conception (Entérinée par l'Asociación Española de Normalización en septembre 2019.)

En cumplimiento del punto 11.2.5.4 de las Reglas Internas de CEN/CENELEC Parte 2, se ha otorgado el rango de documento normativo español UNE al documento normativo europeo EN 13445-3:2014/A6:2019 (Fecha de disponibilidad 2019-03-20)

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Las observaciones a este documento han de dirigirse a:

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 13445-3:2014/A6

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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 A6 modifies the European Standard EN 13445-3:2014; it was approved by CEN on 27 August 2018.

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-CENELEC 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-CENELEC Management Centre has the same status as the official versions.

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

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European foreword

This document (EN 13445-3:2014/A6:2019) 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 September 2019, and conflicting national standards shall be withdrawn at the latest by September 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN 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 EN 13445-3:2014.

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 Modification to Clause 2, Normative references

Add the following new reference at the appropriate place:

"EN 13555:2014, *Flanges and their joints — Gasket parameters and test procedures relevant to the design rules for gasketed circular flange connections*".

2 Modification to G.1, Purpose

Replace the content of this clause with the following text:

"This annex provides a calculation method for bolted, gasketed circular flange joints. It is applicable to flanges and bolted domed ends, and is an alternative to the methods in Clauses 11 and 12. Its purpose is to ensure structural integrity and leak tightness for an assembly comprising two flanges, bolts and a gasket. Flange loadings are shown in Figure G.3-1. Different types of bolts and gaskets are shown in Figures G.3-2 to G.3-3.

Use of this alternative method is particularly recommended in case a more accurate calculation is imposed by one of the following circumstances:

a) need of assuring leak tightness in presence of dangerous fluids;

b) multiple design or testing conditions;

c) presence of additional external loads;

d) presence of temperature differences among the different components of the bolted joint;

e) need to avoid overstress of the bolts and/or the gasket.

Using this alternative calculation method a controlled bolting-up method (see Table G.8-2) is recommended and should be documented by the Manufacturer in the User's manual.

This annex is based on EN 1591-1:2001, *Flanges and their joints — Design rules for gasketed circular flange connections — Part 1: Calculation method*. The new edition of this standard, EN 1591-1:2013, provides a calculation of a bolted joint considering specified leak rates through the gasket: such calculation is however only possible if the gasket manufacturer is able to supply sufficient gasket parameters, or if such parameters are the result of specific testing, carried out in accordance with EN 13555:2014. Therefore, when specified leak rates are a design requirement and when sufficient gasket data are available, EN 1591-1:2013 shall be used as an alternative either to this Annex or to Clauses 11 and 12. The use of EN 1591-1:2013 is not applicable in the case of a bolted joint between a flange and the flanged extension of a heat exchanger tubesheet (see Figures J.12 and J.13) and in the case where a tubesheet is clamped between two flanges (see Figure J.11).".

3 Deletion of Annex GA (informative), Alternative design rules for flanges and gasketed flange connections

Delete the whole informative Annex GA.

4 Modification to Annex J (normative), Alternative method for the design of heat exchanger tubesheets

Replace the whole annex with the following one:

"

Annex J
(normative)

Alternative method for the design of heat exchanger tubesheets

J.1 Purpose

This annex specifies alternative rules to those in Clause 13 for the design of shell and tube heat exchanger tubesheets. They apply to heat exchangers of the following types:

— U-tube type, see Figure J.1; also to exchangers with capped tubes and one tubesheet only and exchangers with curved tubes and a number of separate tubesheets;

— immersed floating head; see Figures J.2 a) and J.2 b);

— externally sealed floating head; see Figure J.3;

— internally sealed floating head; see Figure J.4;

— fixed tubesheet with expansion bellows; see Figure J.5;

— fixed tubesheet without expansion bellows; see Figure J.6.

J.2 Specific definitions

The following terms and definitions are in addition to those in Clause 3.

J.2.1
outer tube limit
circle which encloses all the tubes

J.2.2
load ratio
calculated load or moment applied to a component divided by the allowable load or moment

J.3 Specific symbols and abbreviations

J.3.1 General

The following symbols and abbreviations are in addition to those in Clause 4.

Figures J.1 to J.6 illustrate the six main types of shell and tube heat exchanger. Figures J.7 to J.13 cover specific details. All Figures illustrate general characteristics. They are not intended to cover all of the possible combinations for which the method is valid.

In Figures J.1 to J.6 the outer part of the stationary tubesheet may be either bolted or welded to the adjoining shell(s). The details of this outer tubesheet portion with the relevant flanges (if any) have been sketched with a dark colour, since they are not needed for the determination of the main axial forces (calculation parameter PR). For simplification all the ends have been shown as flat (although they are generally dished).

Baffles and support plates have not been included in the figures.

Other types not shown in Figures J.1 to J.6 include: