



SLOVENSKI STANDARD
SIST EN 13445-3:2014/kFprA2:2015
01-marec-2015

Neogrevane tlačne posode - 3. del: Konstruiranje

Unfired pressure vessels - Part 3: Design

Unbefeuerte Druckbehälter - Teil 3: Konstruktion

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

Ta slovenski standard je istoveten z: EN 13445-3:2014/FprA2

ICS:

23.020.30	Tlačne posode, plinske jeklenke	Pressure vessels, gas cylinders
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SIST EN 13445-3:2014/kFprA2:2015 **en,fr,de**

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

FINAL DRAFT
EN 13445-3:2014

FprA2

January 2015

ICS 23.020.30

English Version

Unfired pressure vessels - Part 3: Design

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

Unbefeuerte Druckbehälter - Teil 3: Konstruktion

This draft amendment is submitted to CEN members for unique acceptance procedure. It has been drawn up by the Technical Committee CEN/TC 54.

This draft amendment A2, if approved, will modify the European Standard EN 13445-3:2014. If this draft becomes an amendment, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document (EN 13445-3:2014/FprA2:2015) has been prepared by Technical Committee CEN/TC 54 “Unfired pressure vessels”, the secretariat of which is held by BSI.

This document is currently submitted to the Unique Acceptance Procedure.

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 document includes the text of the amendment itself. The corrected pages of EN 13445-3 will be published in July 2015 as Issue X of the standard.

EN 13445-3:2014/FprA2:2015 (E)**1 Modification to Annex M**

Delete the existing Annex M and substitute with the following.

Annex M
(informative)
In service monitoring of vessels operating in fatigue or creep

M.1 Purpose

This annex gives guidance on the monitoring of vessels which operate in either fatigue or creep.

M.2 Fatigue operation

The operator should record in a suitable fashion the number of load cycles occurring and a plan should be prepared for the inspection of the vessel throughout its life. Typically, a pressure vessel operating in fatigue should be internally and if necessary externally inspected (by VT, RT, UT, PT, etc. as relevant). Surface inspection is generally more relevant than volumetric inspection.

The first inspection should take place after a period corresponding to not more than 50% of the calculated allowable fatigue life. The following inspections should take place after a further period of not more than 25% of the calculated allowable fatigue life.

NOTE 1 The time of first inspection corresponds to 50 % of the allowable number of cycles when the design stress range spectrum includes only one type of cycle. For more complex loading spectra, it corresponds to the time when a total fatigue damage index of 0,5 (see definition in Clause 17 or Clause 18) has been reached.

NOTE 2 The records of loading cycles may indicate a need for sooner inspection than originally planned on the basis of the design specification.

NOTE 3 For pressure vessels subject to cyclic loading, in-service inspections are of particular importance for early detection of incipient damage. Internal visual inspections should be supplemented by non-destructive tests on highly loaded locations especially by surface crack tests and ultrasonic tests. For monitoring inaccessible areas, an ultrasonic test from the outside surface of the vessel may be appropriate.

If the operating conditions deviate from those assumed in the design calculation according to Clause 17 or Clause 18 and are likely to cause greater fatigue damage, or if other damage of the vessel wall is to be expected owing to other operating influences, before the end of an inspection interval, then the inspection interval should be shortened to 20 % of the allowable number of cycles, or correspond to a total fatigue damage index of 0,2.

M.3 Measures to be taken when the calculated allowable fatigue lifetime has been reached and/or cracks or crack-like defects are detected

When the calculated allowable fatigue lifetime for a component has been reached (i.e. if the allowable number of cycles has been reached, or if the total fatigue damage index according to Clauses 17 or 18 has reached the value 1), non-destructive tests should be performed as completely as possible concentrating on the highly stressed locations.

If no cracks are detected in the non-destructive tests conducted in the inspection intervals and in the test above, continued operation may be allowed. The next inspection intervals should be shortened to correspond either to 20 % of the calculated allowable number of cycles, or to an additional total fatigue damage index of 0,2.

NOTE The period may be able to be increased if damage tolerance analysis based on fracture mechanics is undertaken.

If cracks or crack-like defects, or other more extensive damage are detected, either before or after the calculated allowable fatigue lifetime has been reached, the component or the structural element concerned should be repaired and re-inspected, or replaced, unless continued operation appears admissible by virtue of other appropriate measures. The next inspection interval of this location should be a period corresponding to 20 % of the calculated allowable number of cycles, or corresponding to a total fatigue damage index of 0,2.

The following design, manufacturing and process-related measures can be considered with regard to continued operation:

- a) Removal of cracks by grinding. Possible reduction in wall thickness should be assessed by special analysis.
- b) Grinding the welds to remove all notches.
- c) Elimination of deformation restraints, e.g. replacement of cracked rigid braces by flexible connections.
- d) Change in mode of operation.
- e) Repairs by welding.