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Vervangt NEN-EN 13445-4:2001 2e Ontw.

Nederlandse norm

NEN-EN 13445-4 (en)

Niet aan vlambelasting blootgestelde drukvaten
- Deel 4: Fabricage

Unfired pressure vessels - Part 4: Fabrication

ICS 23.020.30

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VOORBEELD
Preview

Normcommissie 341 032 "Drukapparatuur"

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Voor de in deze norm vermelde normatieve verwijzingen bestaan in Nederland de volgende equivalenten:

<u>vermelde norm</u>	<u>Nederlandse norm</u>	<u>titel</u>
EN 287-1:1992	NEN-EN 287-1:1997	Het kwalificeren van lassers - Smeltlassen - Deel 1: Staal (en,nl)
EN 288-2:1992	NEN-EN 288-2:1997	Het beschrijven en kwalificeren van lasprocedures voor metallische materialen - Deel 2: Lasmethodebeschrijving voor het booglassen (en,nl)
EN 288-3:1992	NEN-EN 288-3:1997	Het beschrijven en kwalificeren van lasprocedures voor metallische materialen - Deel 3: Lasmethodebeproeving voor het booglassen van staal (en,nl)
EN 288-6:1994	NEN-EN 288-6:1994	Het beschrijven en kwalificeren van lasprocedures voor metallische materialen - Deel 6: Goedkeuring op grond van eerder opgedane ervaring (en,nl)
EN 288-7:1995	NEN-EN 288-7:1995	Het beschrijven en kwalificeren van lasprocedures voor metallische materialen - Deel 7: Goedkeuring door middel van een standaardlasmethode voor het booglassen (en,nl)
EN 288-8:1995	NEN-EN 288-8:1995	Het beschrijven en kwalificeren van lasprocedures voor metallische materialen - Deel 8: Goedkeuring door middel van een lasproef voor het begin van de productie (en,nl)
EN 729-2:1994	NEN-EN 729-2:1994	Kwaliteitsborgingssystemen voor lassen - Smeltlassen van metallische materialen - Deel 2: Uitgebreide kwaliteitseisen (en,nl)
EN 729-3:1994	NEN-EN 729-3:1994	Kwaliteitsborgingseisen voor lassen - Smeltlassen van metallische materialen - Deel 3: Standaardkwaliteitseisen (en,nl)
EN 875:1995	NEN-EN 875:1995	Destructieve beproevingen van lasverbindingen in metalen - Kerfslagproeven - Ligging van het proefstuk, oriëntatie van de kerf en beoordeling (en)
EN 876:1995	NEN-EN 876:1995	Destructieve beproevingen van lasverbindingen in metalen - Trekproeven in de lengterichting op het lasmetaal van smeltlassen (en)
EN 895:1995	NEN-EN 895:1995	Destructieve beproevingen van lasverbindingen in metalen - Trekproeven in de dwarsrichting (en)
EN 910:1996	NEN-EN 910:1996	Destructieve beproevingen van lasverbindingen in metalen - Buigproeven (en)
EN 1043-1:1995	NEN-EN 1043-1:1996	Destructieve beproevingen van lasverbindingen in metalen - Hardheidsproeven - Deel 1: Hardheidsproeven voor booglasverbindingen (en)
EN 1321:1996	NEN-EN 1321:1997	Destructieve beproevingen van lasverbindingen in metalen - Macroscopisch en microscopisch onderzoek van lassen (en)
EN 1418:1997	NEN-EN 1418:1998	Laspersoneel - Het kwalificeren van bedieners van lasmachines voor smeltlassen en installers van weerstandlasapparatuur voor geheel mechanisch en automatisch lassen van metallische materialen (en,nl)
EN 10028-2:2002	-	-
EN 10028-3:2002	-	-
EN 10028-4:2002	-	-
EN 10216-1:2002	NEN-EN 10216-1	Naadloze stalen buizen voor toepassingen onder druk - Technische leveringsvoorwaarden - Deel 1: Buizen van ongelegeerd staal met eigenschappen gespecificeerd bij omgevingstemperatuur (en)

EN 10216-2:2002	NEN-EN 10216-2	Naadloze stalen buizen voor toepassingen onder druk - Technische leveringsvoorwaarden - Deel 2: Buizen van ongelegeerd en gelegeerd staal met eigenschappen gespecificeerd bij verhoogde temperatuur (en)
EN 10216-3:2002	NEN-EN 10216-3	Naadloze stalen buizen voor toepassingen onder druk - Technische leveringsvoorwaarden - Deel 3: Buizen van gelegeerd fijnkorrelig staal (en)
EN 10216-4:2002	NEN-EN 10216-4:2002	Naadloze stalen buizen voor toepassingen onder druk - Technische leveringsvoorwaarden - Deel 4: Buizen van ongelegeerd en gelegeerd staal met eigenschappen gespecificeerd bij lage temperatuur (en)
EN 10217-2:2002	NEN-EN 10217-2	Gelaste stalen buizen voor toepassingen onder druk - Technische leveringsvoorwaarden - Deel 2: Elektrisch gelaste buizen van ongelegeerd en gelegeerd staal met eigenschappen gespecificeerd bij verhoogde temperatuur (en)
EN 10217-3:2002	NEN-EN 10217-3	Gelaste stalen buizen voor toepassingen onder druk - Technische leveringsvoorwaarden - Deel 3: Buizen van gelegeerd fijnkorrelig staal (en)
EN 10217-5:2002	NEN-EN 10217-5:2002	Gelaste stalen buizen voor toepassingen onder druk - Technische leveringsvoorwaarden - Deel 5: Onderpoedergelaste buizen van ongelegeerd en gelegeerd staal met eigenschappen gespecificeerd bij verhoogde temperatuur (en)
EN 10217-6:2002	NEN-EN 10217-6:2002	Gelaste stalen buizen voor toepassingen onder druk - Technische leveringsvoorwaarden - Deel 6: Onderpoedergelaste buizen van ongelegeerd staal met eigenschappen gespecificeerd bij lage temperatuur (en)
EN 10222-2:2002	-	-
EN 10222-3:2002	-	-
EN 10222-4:2002	-	-
EN 13445-1:2002	NEN-EN 13445-1:2002	Niet aan vlambelasting blootgestelde drukvaten - Deel 1: Algemeen (en)
EN 13445-2:2002	NEN-EN 13445-2:2002	Niet aan vlambelasting blootgestelde drukvaten - Deel 2: Materialen (en)
EN 13445-3:2002	NEN-EN 13445-3:2002	Niet aan vlambelasting blootgestelde drukvaten - Deel 3: Ontwerp (en)
EN 13445-5:2002	NEN-EN 13445-5:2002	Niet aan vlambelasting blootgestelde drukvaten - Deel 5: Inspectie en beproeving (en)

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English version

Unfired pressure vessels - Part 4: Fabrication

Réceptifs sous pression non soumis à la flamme - Partie
4: Fabrication

Unbefeuerte Druckbehälter - Teil 4: Herstellung

This European Standard was approved by CEN on 23 May 2002.

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Preview



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COMITÉ EUROPÉEN DE NORMALISATION
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Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document (EN 13445-4:2002) 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 November 2002, and conflicting national standards shall be withdrawn at the latest by November 2002.

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.

In this standard the Annexes A and B are informative.

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*

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This document specifies requirements for the manufacture of unfired pressure vessels and their parts, made of steels, including their connections to non-pressure parts. It specifies requirements for material traceability, manufacturing tolerances, welding requirements, production tests, forming requirements, heat treatment, repairs and finishing operations.

This document does not give provisions for manufacturing requirements for vessels designed using Design by Analysis – Direct Route (DBA) of Annex B of EN 13445–3:2002.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 287-1:1992, *Approval testing of welders — Fusion welding — Part 1: Steels.*

EN 288-2:1992, *Specification and approval of welding procedures for metallic materials — Part 2: Welding procedure specification for arc welding.*

EN 288-3:1992, *Specification and approval of welding procedures for metallic materials — Part 3: Welding procedure tests for the arc welding of steels.*

EN 288-6:1994, *Specification and approval of welding procedures for metallic materials — Part 6: Approval related to previous experience.*

EN 288-7:1995, *Specification and approval of welding procedures for metallic materials — Part 7: Approval by a standard welding procedure for arc welding.*

EN 288-8:1995, *Specification and approval of welding procedures for metallic materials — Part 8: Approval by a pre-production welding test.*

EN 729-2:1994, *Quality requirements for welding — Fusion welding of metallic materials — Part 2: Comprehensive quality requirements.*

EN 729-3:1994, *Quality requirements for welding — Fusion welding of metallic materials — Part 3: Standard quality requirements.*

EN 875:1995, *Destructive tests on welds in metallic materials — Impact tests — Test specimen location, notch orientation and examination.*

EN 876:1995, *Destructive tests on welds in metallic materials — Longitudinal tensile test on weld metal in fusion welded joints.*

EN 895:1995, *Destructive tests on welds in metallic materials — Transverse tensile test.*

EN 910:1996, *Destructive tests on welds in metallic materials — Bend tests.*

EN 1043:1995-1, *Destructive tests on welds in metallic materials — Hardness testing — Part 1: Hardness test on arc welded joints.*

EN 1321:1996, *Destructive tests on welds in metallic materials — Macroscopic and microscopic examination of welds.*

EN 1418:1997, *Welding personnel — Approval testing of welding operators for fusion welding and resistance weld setters for fully mechanized and automatic welding of metallic materials.*

EN 10028-2:2002, *Flat products made of steels for pressure purposes — Part 2: Non-alloy and alloy steels with specified elevated temperature properties.*

EN 10028-3:2002, *Flat products made of steels for pressure purposes — Part 3: Weldable fine grain steels, normalized.*

EN 10028-4:2002, *Flat products made of steels for pressure purposes — Part 4: Nickel alloy steels with specified low temperature properties.*

EN 10216-1:2002, *Seamless steel tubes for pressure purposes — Technical delivery conditions — Part 1: Non-alloy steel tubes with specified room temperature properties.*

EN 10216-2:2002, *Seamless steel tubes for pressure purposes — Technical delivery conditions — Part 2: Non-alloy and alloy steel tubes with specified elevated temperature properties.*

EN 10216-3:2002, *Seamless steel tubes for pressure purposes — Technical delivery conditions — Part 3: Alloy fine grain steel tubes.*

EN 10216-4:2002, *Seamless steel tubes for pressure purposes — Technical delivery conditions — Part 4: Non-alloy and alloy steel tubes with specified low temperature properties.*

EN 10217-1:2002, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 1: Non-alloy steel tubes with specified room temperature properties.*

EN 10217-2:2002, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 2: Electric welded non-alloy and alloy steel tubes with specified elevated temperature properties.*

EN 10217-3:2002, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 3: Alloy fine grain steel tubes.* EN 10217-4:2002, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 4: Electric welded non-alloy and alloy steel tubes with specified low temperature properties.*

EN 10217-5:2002, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 5: Submerged arc welded non-alloy and alloy steel tubes with specified elevated temperature properties.*

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

EN 10222-2:2002, *Steel forgings for pressure purposes — Part 2: Ferritic and martensitic steels with specified elevated temperature properties.*

EN 10222-3:2002, *Steel forgings for pressure purposes — Part 3: Nickel steels with specified low temperatures properties.*

EN 10222-4:2002, *Steel forgings for pressure purposes — Part 4: Weldable fine grain steels with high proof strength.*

EN 13445-1:2002, *Unfired pressure vessels — Part 1: General.*

EN 13445-2:2002, *Unfired pressure vessels — Part 2: Materials.*

EN 13445-3:2002, *Unfired pressure vessels — Part 3: Design.*

EN 13445-5:2002, *Unfired pressure vessels — Part 5: Inspection and testing.*

3 Requirements for manufacturing and subcontracting

3.1 Manufacturing

The general responsibilities of the pressure vessel manufacturer are stated in EN 13445-1:2002. Additionally to those requirements, the manufacturer shall ensure that:

- a) the organisation for the control of manufacturing operations which includes special processes such as welding, forming and heat treatment shall be clearly defined by the manufacturer;
- b) the manufacturing procedures such as welding, forming and heat treatment are adequate for the purpose and the pressure vessel meets the requirements of this standard. Where specific requirements are associated with materials these shall be taken into account, e.g. EAMs;
- c) the manufacturing equipment is adequate for fabrication;
- d) the staff is adequate for the assigned tasks;

NOTE As far as welding co-ordination is concerned, the qualifications, tasks and responsibilities can be defined by the manufacturer in accordance with EN 719 [1] in the job assignment.

- e) the quality requirements for welding defined in EN 729-3:1994 are met as a minimum.

3.2 Subcontracting

The manufacturer may subcontract work, but shall ensure that the subcontractor carries out the work in accordance with the requirements of this European Standard. The manufacturer is responsible for the adequate definition of the subcontracted task and the need for any associated records.

On all occasions that the subcontractor work includes

- a) welding;
- b) forming including associated heat treatment;
- c) post weld heat treatment;
- d) non-destructive testing of welds (see EN 13445-5:2002).

The manufacturer shall obtain a subcontractor form (see Annex B).

Where welding operations are subcontracted, the manufacturer shall also either obtain copies of the welding procedure and welding operator qualification records or take other action to ensure that they comply with this standard.

In discharging his responsibility to ensure that the subcontractor carries out the work in accordance with this standard the manufacturer shall ensure that surveillance of the subcontracted work is performed.

Where a manufacturer is producing equipment that requires the intervention of a responsible authority, the manufacturer should inform the responsible authority of his intention to subcontract so that the responsible authority has the opportunity to take part in the subcontractor surveillance.

NOTE 1 See also prEN 764-3:1998, 2.11 [2] and CR 13445-7.

NOTE 2 When the manufacturer is producing equipment based on quality assurance, the controls a manufacturer applies over subcontractors should be described in his approved quality system.

4 Materials

4.1 General

Materials for pressure vessels and the grouping of materials for pressure vessels shall be in accordance with EN 13445-2:2002.

The grouping applies regardless of product form, i.e. plate, forging, piping.

4.2 Material traceability

4.2.1 General

The vessel manufacturer shall have and maintain an identification system for materials used in fabrication, so that all material subject to stress due to pressure and those welded thereto in the completed work can be traced to its origin. This includes the use of welding consumables.

4.2.2 Identification system

4.2.2.1 The vessel manufacturer's identification system shall assure that all materials to be used in the vessel have been subjected to and satisfactorily passed the following:

- a) examination of material before fabrication for the purpose of detecting, as far as possible, imperfections which would affect the safety of the work;
- b) check of material to determine that it has the required thickness;
- c) check of the material to assure that the materials are permitted by this European Standard, fully traceable to the correct material certification and as specified in the design documentation;
- d) check of the welding consumables to assure the correct markings and that correct conditions are maintained to prevent deterioration.

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