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Unfired pressure vessels - Part 4: Fabrication

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Unfired pressure vessels - Part 4: Fabrication

Unbefeuerte Druckbehälter - Teil 4: Herstellung

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

This draft amendment A3, if approved, will modify the European Standard EN 13445-4:2002. 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 COMITÉ EUROPÉEN DE NORMALISATION EUROPÄISCHES KOMITEE FÜR NORMUNG

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EN 13445-4:2002/prA3:2006 (E)

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Foreword

This document (EN 13445-4:2002/prA3:2006) 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 CEN Enquiry.

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).

1 Modification of normative references

In clause 2 "Normative references" the following references shall be changed:

Delete

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

and replace with

"EN ISO 15609-1:2004, Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 1: Arc welding (ISO 15609-1:2004)"

Delete

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

and replace with

"EN ISO 15614-1:2004, Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys (ISO 15614-1:2004)"

Delete

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

and replace with

"EN ISO 15611:2003, Specification and qualification of welding procedures for metallic materials — Qualification based on previous welding experience (ISO 15611:2003); German version EN ISO 15611:2003"

Delete

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

and replace with

"EN ISO 15612:2004, Specification and qualification of welding procedures for metallic materials — Qualification by adoption of a standard welding procedure (ISO 15612:2004)"

Delete

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

and replace with

"EN ISO 15613:2004, Specification and qualification of welding procedures for metallic materials — Qualification based on pre-production welding test (ISO 15613:2004)"

Furthermore, all references in this clause shall be indicated as dated references (also see Guideline 10/5).

In all cited places in the subsequent text of EN 13445-4 the above changes of references shall be performed accordingly.

2 Modification of the text of the note to h_1 in Table 5.4-3

The wording of the note to dimension h_1 in Table 5.4-3 (see sub-clause 5.4.6) shall be modified to read:

"The length of the straight flange need, however, not be more than:"

and in the next line the text in the right column shall be modified to read:

"Length of the straight flange"

3 Modification of the text of paragraph a) in sub-clause 7.3

The text of paragraph a) in sub-clause 7.3 shall be amended to read:

"a) For test plates on butt joints equal to and over 20 mm thickness a longitudinal weld tensile test having a minimum diameter equal to and over 6 mm shall be performed in accordance with EN 876:1995 and $R_{\rm et}$, $R_{\rm m}$ and $A_{\rm 5}$ shall satisfy specified requirements of the base material or for weld consumables requirements in EN 13445-2:2002, clause 4.3.5 or other relevant values specifically taken into account in the design (e.g. austenitic filler metal in 9 % Nickel steel).

Where the design temperature is higher than 300 $^{\circ}\text{C}$ then the test shall be done at the design temperature.

NOTE 1 Special consideration should be given where the mechanical properties of the weld are below the base materials by design, e.g. 9 % Ni steels welded with austenitic filler metal."

4 Modification of the text of sub-clause 8.2

Delete the text of sub-clause 8.2 beginning from the first paragraph until and including section a) and replace it with the following wording:

"8.2 Reference criteria

The criteria for the determination the number of production test plates are given below. This is dependent upon the material, the length of welded joints, the thickness, post weld heat treatment (PWHT) and the joint coefficient for each qualified weld procedure. Special provisions are given for testing group 4. The actual testing of production test plates are dependent on the material and the thickness. Additional specific impact testing requirements are also addressed below.

- a) In addition to the requirements in c) to e) below impact tests (in accordance with EN 13445-2-2002 B 3.) shall be carried out on a production test plate coupon in the following situations. Where a test plate is required by c) to e) below then the impact specimens may be cut from the test plate along with the other required test specimens. Where a test plate is not required by c) to e) then a short test plate sufficient in length only to obtain the required impact tests plus any allowance for retests shall be produced at a frequency of one test plate per vessel welded to the same procedure as the longitudinal seams. Where a number of similar vessels are welded at the same time, to the same welding procedure using the same batch of welding consumables, they may be represented by one production test for impact tests up to a maximum of 25 m of longitudinal weld by agreement between the manufacturer, inspection body and customer, as appropriate.
- 1) When the material thickness is greater than 12 mm and the required impact temperature $T_{\rm KV}$ is below 10 °C and the impact test temperature of the welding procedure qualification test qualifying the seam to achieve the required impact energy is not more than 15°C below the $T_{\rm KV}$.

2) When the material thickness is greater than 6 mm, but less than or equal to 12mm, and the required impact temperature $T_{\rm KV}$ is below - 30 °C and the impact test temperature of the welding procedure qualification test qualifying the seam to achieve the required impact energy is not more than 15 °C below $T_{\rm KV}$. These requirements are summarised in table 8.2.

Table 8.2 Required production control test plate for impact tests

Thickness of weld seam	T _{KV} ≥ –10 °C	T _{KV} < -10 °C ≥ -30 °C		T _{KV} < –30 °C	
		T _{PQR} ≤	T _{PQR} >	T _{PQR} ≤	T _{PQR} >
		T _{KV} –15 °C	T _{KV} –15 °C	T _{KV} –15 °C	T _{KV} -15 °C
≤ 6 mm	no	no	no	no	no
> 6 ≤ 12 mm	no	no	no	No	yes
> 12 mm	no	no	yes	no	yes

 T_{PQR} = the impact test temperature used on the relevant Welding Procedure Qualification test to achieve the required impact energy.

 $T_{\rm KV}$ = the required impact test temperature taken from EN 13445-2:2002, Annex B.

NOTE When PQR data is at a different test temperature from the required impact test temperature, it may be converted to a common temperature base on the basis of 1,5 J per °C. Such conversion shall be permitted only in the range of 18 J to 55 J of Charpy V impact energy. Values in excess of 55 J shall be taken as 55 J. The 1,5 J per °C relationship may also be utilised to determine the temperature adjustment when seeking to compare data at common impact energy levels, however, this may not exceed 15 °C reduction.

Example 1:

33 J at -20 °C may be regarded as equivalent to 40 J at -15 °C.

Example 2: (restriction to max. 55 J)

100 J at -20 °C may be regarded as equivalent to 40 J at -30 °C.

Example 3: (restriction to max. 55 J and reduction of max. 15 °C)

100 J at -20 °C may be regarded as equivalent to 27 J at -35 °C."