BS EN 13445-4:2026

BSI Standards Publication

Unfired pressure vessels

Part 4: Fabrication



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National foreword

This British Standard is the UK implementation of EN 13445-4:2026. It supersedes BS EN 13445-4:2021+A1:2023, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PVE/1, Pressure Vessels.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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For the Great Britain market (England, Scotland and Wales), if UK Government has designated this publication for conformity with UKCA marking (or similar) legislation, it may contain an additional National Annex. Where such a National Annex exists, it shows the correlation between this publication and the relevant UK legislation. If there is no National Annex of this kind, the relevant Annex ZA or ZZ in the body of the European text will indicate the relationship to UK regulation applicable in Great Britain. References to EU legislation may need to be read in accordance with the UK designation and the applicable UK law. Further information on designated standards can be found at www.bsigroup.com/standardsandregulation.

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UK Government is responsible for legislation. For information on legislation and policies relating to that legislation, consult the relevant pages of www.gov.uk.

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Full document details: BS EN 13445-4-2026 Unfired pressure vessels Part 4: Fabrication

Contents

Page

European foreword ... 5

1 Scope ... 5

2 Normative references ... 6

3 Terms and definitions ... 7

4 Requirements for manufacturing and subcontracting ... 7
4.1 Manufacturing ... 7
4.2 Subcontracting ... 8

5 Materials ... 8
5.1 General ... 8
5.2 Material traceability ... 8
5.2.1 General ... 8
5.2.2 Identification system ... 9
5.2.3 Visibility ... 9
5.2.4 Review of material certification and material identification ... 9
5.2.5 Transfer of markings ... 10

6 Manufacturing tolerances ... 10
6.1 Surface geometry of welds ... 10
6.2 Middle line alignment ... 10
6.3 Surface alignment ... 12
6.3.1 Surface misalignment between parts ... 12
6.3.2 Joining of parts of different thickness ... 12
6.4 Tolerances for vessels subjected to internal pressure ... 12
6.4.1 External diameter ... 12
6.4.2 Out of roundness ... 12
6.4.3 Deviation from the longitudinal axis ... 13
6.4.4 Irregularities in profile ... 13
6.4.5 Local thinning ... 15
6.4.6 Dished ends ... 16
6.5 Tolerances for vessels subjected to external pressure ... 19
6.6 Structural tolerances ... 19

7 Weld details ... 19
7.1 General ... 19
7.2 Vessels or parts made of more than one course ... 19
7.3 Lapped joints, joggle joints, permanent backing strips ... 19

8 Welding ... 20
8.1 General ... 20
8.2 Welding procedure specification (WPS) ... 20
8.3 Welding procedure qualification record (WPQR) ... 20
8.4 Qualification of welders and welding operators ... 21
8.5 Filler metals and auxiliary materials ... 22
8.6 Joint preparation ... 22
8.7 Execution of welded joints ... 23
8.8 Attachments, supports and stiffeners ... 23
8.9 Preheat ... 23
8.10 Permanent joints other than welding ... 23

Documents
Document Sharing Hub
Full document details: BS EN 13445-4-2026 Unfired pressure vessels Part 4: Fabrication

8.10.1 General 23
8.10.2 Mechanical roller expansion 24
8.10.3 Brazing 24

9 Manufacture and testing of welds — Production test 24
9.1 General 24
9.2 Reference criteria 25
9.3 Extent of testing 28
9.4 Performance of tests and acceptance criteria 30
9.4.1 General 30
9.4.2 Transverse tensile test 30
9.4.3 Longitudinal weld tensile test 30
9.4.4 Impact test 30
9.4.5 Bend test 30
9.4.6 Macro examination 31
9.4.7 Micro examination 31
9.4.8 Hardness test 31
9.4.9 Retests 31
9.4.10 Test report 32

10 Forming of pressure parts 32
10.1 General 32
10.2 Ratio of deformation 32
10.2.1 Dished circular products 32
10.2.2 Cylinders and cones made by rolling 33
10.2.3 Other product types 34
10.2.4 Tube bends 35
10.2.5 Forming of Segments 35
10.3 Forming procedures 36
10.3.1 Cold forming 36
10.3.2 Hot forming 37
10.4 Heat treatment after forming 39
10.4.1 General 39
10.4.2 Heat treatment of flat products after cold forming 39
10.4.3 Heat treatment of tubular products after cold forming 41
10.4.4 Heat treatment of clad steels after cold forming 41
10.4.5 Heat treatment after hot forming 41
10.4.6 Heat treatment of clad steels after hot forming 42
10.5 Sampling of formed test coupons 42
10.5.1 Cold formed products without heat treatment 42
10.5.2 Hot formed or cold formed products with heat treatment 42
10.6 Tests 43
10.6.1 Base material 43
10.6.2 Butt welds 43
10.6.3 Acceptance criteria for formed test coupons 43
10.6.4 Retests of formed coupons 44
10.7 Visual inspection and control of dimension 44
10.8 Marking 44
10.9 Documentation 45

11 Post weld heat treatment (PWHT) 45
11.1 General 45
11.2 Heat treatment conditions 46
11.3 Method of PWHT 49
11.4 PWHT procedure 50

AVA Documents
Document Sharing Hub

Full document details: BS EN 13445-4-2026 Unfired pressure vessels Part 4: Fabrication

11.5 Mechanical properties after heat treatment ... **51**
11.6 Dissimilar ferritic joints ... **52**
11.7 Special materials ... **53**
11.8 Heat Treatment for reasons other than welding ... **53**

12 Repairs ... **53**
12.1 Repairs of surface defects in the parent metal ... **54**
12.2 Repair of weld defects ... **54**

13 Finishing operations ... **55**

Annex A (informative) **Structural tolerances** ... **56**

Annex B (informative) **Example of a sub-contractors form** ... **60**

Annex C (normative) **Specification and approval of expansion procedures and operators** ... **61**
C.1 General ... **61**
C.1.1 Introduction ... **61**
C.1.2 Responsibility ... **61**
C.1.3 Specification of expansion procedures ... **61**
C.1.4 Technical content of expansion procedure specification (EPS) ... **62**
C.1.5 Expansion procedure qualification test (EPQT) ... **63**
C.2 Examination and testing ... **63**
C.2.1 General ... **63**
C.2.2 Visual examination ... **63**
C.2.3 Dimensional verification ... **63**
C.2.4 Testing ... **64**
C.3 Range of approval ... **64**
C.3.1 General ... **64**
C.3.2 Manufacturer ... **64**
C.3.3 Material ... **64**
C.3.4 Tube dimensions ... **64**
C.3.5 Expansion factor ... **65**
C.3.6 Joint design ... **65**
C.3.7 Tool ... **65**
C.3.8 PWHT ... **65**
C.4 Expansion Procedure Approval Record (EPAR) ... **65**
C.5 Expansion operator approval ... **66**
C.5.1 General ... **66**
C.5.2 Validity range of expansion operator qualification ... **66**
C.5.3 Qualification tests ... **66**
C.5.4 Examination and testing ... **66**
C.5.5 Period of validity ... **67**
C.5.6 Certification ... **67**

Annex Y (informative) **History of EN 13445-4** ... **68**
Y.1 Differences between EN 13445-4:2014 and EN 13445-4:2021 ... **68**
Y.2 Differences between EN 13445-4:2021 and EN 13445-4:2026 ... **68**

Annex ZA (informative) **Relationship between this European Standard and the essential requirements of Directive 2014/68/EU aimed to be covered** ... **69**

Bibliography ... **70**

Documents
Document Sharing Hub
Full document details: BS EN 13445-4-2026 Unfired pressure vessels Part 4: Fabrication

European foreword

This document (EN 13445-4:2026) 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 December 2026, and conflicting national standards shall be withdrawn at the latest by December 2026.

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 supersedes EN 13445-4:2021+A1:2023.

Annex Y provides details of significant technical changes between this European Standard and the previous edition.

This document has been prepared under a standardization request addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

For the relationship with EU Legislation, see informative Annex ZA, which is an integral part of this document.

A list of all parts in the EN 13445 series can be found on the CEN website.

Although these Parts may be obtained separately, it should be recognized that the Parts are interdependent. As such, the manufacture of unfired pressure vessels requires the application of all the relevant Parts in order for the requirements of the Standard to be satisfactorily fulfilled.

Corrections to the standard interpretations where several options seem possible are conducted through the Migration Help Desk (MHD). Information related to the Help Desk can be found at https://unm.fr/en/maintenance-agencies/maintenance-agency-en-13445/. A form for submitting questions can be downloaded from the link to the MHD website. After subject experts have agreed an answer, the answer will be communicated to the questioner. Corrected pages will be given specific issue number and issued by CEN according to CEN Rules. Interpretation sheets will be posted on the website of the MHD.

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Full document details: BS EN 13445-4-2026 Unfired pressure vessels Part 4: Fabrication

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, requirements for permanent joints other than welding, production tests, forming requirements, heat treatment, repairs and finishing operations.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 13134:2000, *Brazing — Procedure approval*

EN 13445-1:2026, *Unfired pressure vessels — Part 1: General*

EN 13445-2:2026, *Unfired pressure vessels — Part 2: Materials*

EN 13445-3:2026, *Unfired pressure vessels — Part 3: Design*

EN 13445-5:2026, *Unfired pressure vessels — Part 5: Inspection and testing*

EN 14276-1:2020, *Pressure equipment for refrigerating systems and heat pumps — Part 1: Vessels — General requirements*

EN ISO 3834-2:2021, *Quality requirements for fusion welding of metallic materials — Part 2: Comprehensive quality requirements (ISO 3834-2:2021)*

EN ISO 3834-3:2021, *Quality requirements for fusion welding of metallic materials — Part 3: Standard quality requirements (ISO 3834-3:2021)*

EN ISO 4136:2012, *Destructive tests on welds in metallic materials — Transverse tensile test (ISO 4136:2012)*

EN ISO 5173:2010, *Destructive tests on welds in metallic materials — Bend tests (ISO 5173:2009)*

EN ISO 5178:2019, *Destructive tests on welds in metallic materials — Longitudinal tensile test on weld metal in fusion welded joints (ISO 5178:2019)*

EN ISO 9015-1:2011, *Destructive tests on welds in metallic materials — Hardness testing — Part 1: Hardness test on arc welded joints (ISO 9015-1:2001)*

EN ISO 9016:2022, *Destructive tests on welds in metallic materials — Impact tests — Test specimen location, notch orientation and examination (ISO 9016:2022)*

EN ISO 9606-1:2017, *Qualification testing of welders — Fusion welding — Part 1: Steels (ISO 9606 - 1:2012 including Cor 1:2012 and Cor 2:2013)*

EN ISO 13585:2012, *Brazing — Qualification test of brazers and brazing operators (ISO 13585:2012)*

EN ISO 14732:2013, *Welding personnel — Qualification testing of welding operators and weld setters for mechanized and automatic welding of metallic materials (ISO 14732:2013)*

Documents
Document Sharing Hub
Full document details: BS EN 13445-4-2026 Unfired pressure vessels Part 4: Fabrication

EN ISO 15609-1:2019, *Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 1: Arc welding (ISO 15609-1:2019)*

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

EN ISO 15612:2018, *Specification and qualification of welding procedures for metallic materials — Qualification by adoption of a standard welding procedure (ISO 15612:2018)*

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

EN ISO 15614-1:2017, *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 15614-1:2017, Corrected version 2017-10-01)*

EN ISO 17639:2022, *Destructive tests on welds in metallic materials — Macroscopic and microscopic examination of welds (ISO 17639:2022)*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

4 Requirements for manufacturing and subcontracting

4.1 Manufacturing

The general responsibilities of the pressure vessel manufacturer are stated in EN 13445-1:2026. Additionally to those requirements, the manufacturer shall ensure that:

a) the organization 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 ISO 14731:2019 [1] in the job assignment.

e) the quality requirements for welding defined in EN ISO 3834-3:2021 are met as a minimum.

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4.2 Subcontracting

The manufacturer may subcontract work, but shall ensure that the subcontractor carries out the work in accordance with the requirements of this document. 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 13445-5:2026);

e) 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 See also EN 764-3:2002, 2.11 [2] and CR 13445-7:2002.

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.

5 Materials

5.1 General

Materials for pressure vessels and the grouping of materials for pressure vessels shall be in accordance with EN 13445-2:2026.

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

5.2 Material traceability

5.2.1 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.

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5.2.2 Identification system

5.2.2.1 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 document, 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.

5.2.2.2 Material traceability to the original identification markings shall be by one or more of the following methods:

a) accurate transfer of the original identification markings to a location where the markings will be visible on the completed vessel;

b) identification by a coded marking traceable to the original required marking;

c) recording the identification markings using material lists or as built sketches which assure identification of each piece of material during fabrication and subsequent identification in the completed vessel;

d) the EN- or EN-ISO-designation or brand name of the welding consumables shall be recorded.

5.2.3 Visibility

Materials which cannot be stamped or which will not be visible after the vessel is completed or for small multiple parts or non pressure parts the manufacturer may operate a documented system which ensures material traceability for all materials in the completed vessel.

5.2.4 Review of material certification and material identification

All material certification shall be reviewed upon receipt. The review shall cover the completeness and adequacy of the reports against the following:

a) mechanical and chemical properties required to be reported by the material specification;

b) assuring that the reported results meet the requirements of the specification;

c) all markings required by the material specification are satisfied and that there is traceability between the actual markings and those recorded on the material certification.

All materials certification shall be made readily available throughout manufacture.

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5.2.5 Transfer of markings

In case the original identification markings are unavoidably cut out or the material is divided into two or more pieces the markings shall be accurately transferred by the manufacturer's nominated personnel prior to cutting.

The actual material marking shall be by methods which are not harmful to the material in subsequent use/operation.

The transfer of markings shall take place before partitioning of the product and after verification of the marks present with the corresponding certification.

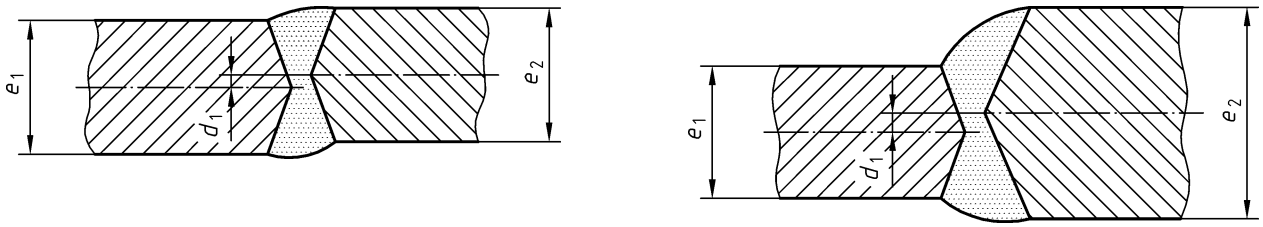
6 Manufacturing tolerances

6.1 Surface geometry of welds

The surface geometry of welded butt and fillet joints shall meet the requirements of EN 13445-5:2026, 5.3 and 6.6, unless the drawing specifies more stringent requirements.

6.2 Middle line alignment

The misalignment tolerances of middle lines shall be as specified in Tables 6.2-1, 6.2-2, 6.2-3 and Figure 6.2-1.



a) Middle line alignment d_1 at equal thickness $e_1 = e_2$ **b) Middle line alignment d_1 at different thickness $e_1 \leq e_2$**

Figure 6.2-1 — Middle line alignment d_1

For longitudinal welds in cylinders, cones and rectangular/prismatic structures the middle lines of adjacent components (whether of equal or different thickness) shall be aligned within the tolerances specified in Table 6.2-1.

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Table 6.2-1 — Offset of middle lines for longitudinal welds in cylinders, cones and rectangular/prismatic structures

Dimensions in millimetres

Thinner part thickness e_1	Maximum misalignment d_1
$e_1 \leq 2$	0,5
$2 < e_1 \leq 4$	$e_1/4$
$4 < e_1 \leq 10$	1
$10 < e_1 \leq 30$	$e_1/10$
$30 < e_1 \leq 60$	$e_1/30 + 2$
$60 < e_1$	4

For longitudinal welds in dished ends and welds in spherical components the middle lines of adjacent parts (whether of equal or different thickness) shall be aligned within the tolerances specified in Table 6.2-2.

Table 6.2-2 — Offset of middle lines for longitudinal welds in dished ends and in spherical components of adjacent parts

Dimensions in millimetres

Thinner part thickness e_1	Maximum misalignment d_1
$e_1 \leq 2$	0,5
$2 < e_1 \leq 4$	$e_1/4$
$4 < e_1 \leq 10$	1
$10 < e_1 \leq 30$	$e_1/10$
$30 < e_1 \leq 120$	$e_1/30 + 2$
$120 < e_1$	6

For circumferential welds the middle lines of adjacent parts (whether of equal or different thickness) shall be aligned within the tolerances specified in Table 6.2-3.

Table 6.2-3 — Offset of middle lines of circumferential welds of adjacent parts

Dimensions in millimetres

Thinner part thickness e_1	Maximum misalignment d_1
$e_1 \leq 30$	$e_1/10 + 1$
$30 < e_1 \leq 150$	$e_1/30 + 3$
$150 < e_1$	8

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6.3 Surface alignment

6.3.1 Surface misalignment between parts

Where there is misalignment at the surface between parts of the same nominal thickness the transition across the weld shall be smooth and gradual with a slope of 1 in 4 over the width of the weld. If this taper cannot be accommodated within the weld width it is permissible to either:

a) grind the higher plate surface, where this will not reduce the joint thickness at any point below the nominal specified plate thickness minus the plate thickness tolerance;

b) build up the lower plate surface with added weld metal.

6.3.2 Joining of parts of different thickness

Where different thickness are being joined a taper shall be produced in accordance with EN 13445-3:2026 by either:

a) taper the thicker plate in accordance with the design drawing and then applying the requirements above for the same nominal thickness parts; or

b) obtain the required slope across the width of the welds, or by a combination of weld build up on the lower surface with added weld metal and thereafter obtain the required slope across the weld width.

6.4 Tolerances for vessels subjected to internal pressure

6.4.1 External diameter

For cylindrical and spherical pressure vessels the mean external diameter derived from the circumference shall not deviate by more than 1,5 % from the specified external diameter.

For rectangular vessels and/or prismatic structures each external dimension shall not deviate by more than 1,5 % from the specified external dimension.

6.4.2 Out of roundness

Out of roundness (O) shall be calculated in accordance with the following Formula (6.4-1):

$$O\,[\%] = \frac{2 \cdot (D_{max} - D_{min})}{D_{max} + D_{min}} \cdot 100 \qquad (6.4\text{-}1)$$

It shall not exceed the following values:

a) 1,5 % for the ratio of $e/D < 0{,}01$;

b) 1,0 % for the ratio of $e/D \geq 0{,}01$.

NOTE The determination of the out of roundness need not consider the elastic deformation due to the deadweight of the pressure vessel.

Irregularities in vessel profile (e.g. dents, buckling, flats on nozzle positions) shall be also within the tolerances in a) and b). A greater out of roundness may be acceptable provided they have been proven admissible by calculation or strain gauge measurements.

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6.4.3 Deviation from the longitudinal axis

The deviation from the longitudinal axis over the length of the cylindrical portion of the pressure vessel shall not exceed 0,5 % of the length of the shell.

6.4.4 Irregularities in profile

a) Local irregularities in vessel profile

Irregularities in profile (e.g. dents, buckling, flats on nozzle positions) shall be smooth and the depth shall be checked by a 20° gauge and shall not exceed the following values:

1) 2 % of the gauge length; or

2) 2,5 % of the gauge length provided that the length of the irregularities does not exceed one quarter of the length (with a maximum of 1 m) of the shell part between two circumferential joints.

Greater irregularities require proof by calculation or strain gauge measurement that the stresses are permissible.

b) Peaking on longitudinal butt welds

When irregularity in the profile occurs at the welded joint and is associated with "flats" adjacent to the weld, the irregularity in profile or (peaking) shall not exceed the values given in Tables 6.4-1 and 6.4-2.

Measurement for peaking shall be made by means of a 20° profile gauge (or template), see Figure 6.4-1, or other types of gauge such as a bridge gauges or needle gauges.

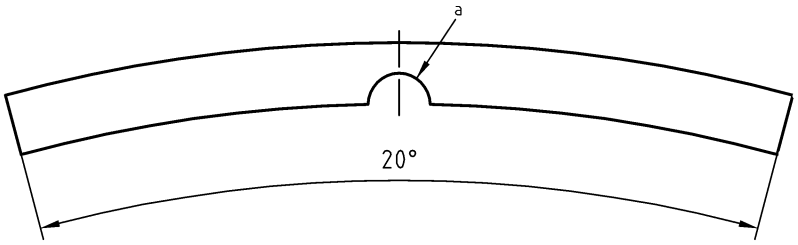
For outwards peaking two readings shall be taken, P_1 and P_2 on each side of the joint, at any particular location, the maximum peaking is determent using Formula (6.4-2)

$$P = 0{,}25.(P_1 + P_2) \qquad (6.4\text{-}2)$$

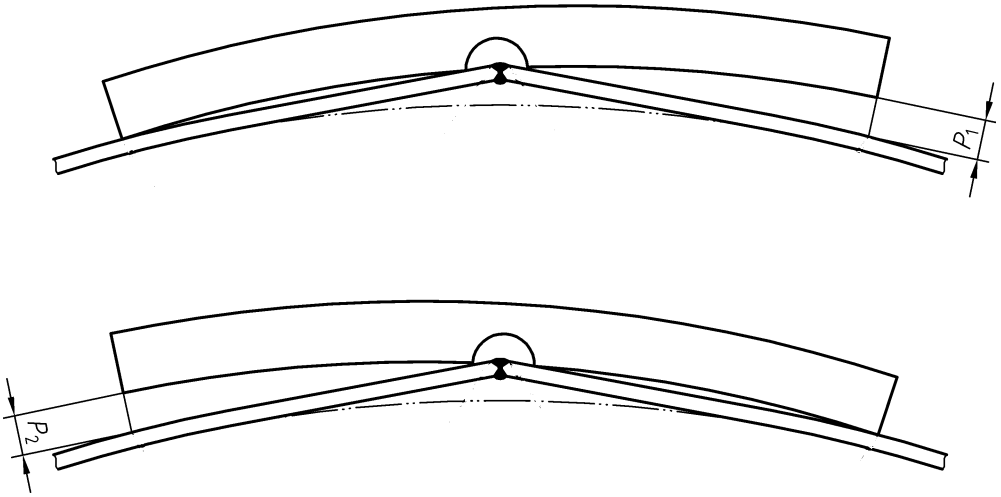
The inwards peaking P shall be measured.

The inside radius of the gauge shall be equal to the nominal outside radius of the vessel.

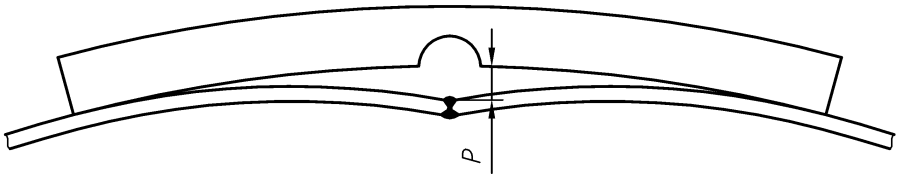
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a) sufficient cut-out to adequately keep clear off the weld reinforcement



b) For outwards peaking two readings P_1 and P_2 shall be taken



c) For inwards peaking P shall be measured

Figure 6.4-1 — Gauge details, measurement of peaking

Measurements shall be taken at approximately 250 mm intervals on longitudinal seams to determine the location with the maximum peaking value. The maximum peaking value for dynamic and cyclic loads shall be in accordance with Table 6.4-1 and for static loads in accordance with Table 6.4-2.

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Table 6.4-1 — Maximum permitted peaking *P* in longitudinal welds for dynamic and cyclic loads

Dimensions in millimetres

Vessel wall thickness e	Maximum permitted peaking P
$e \leq 3$	1,5
$3 \leq e < 6$	2,5
$6 \leq e < 9$	3,0
$9 \leq e$	the lesser of $e/3$, or 10 mm

For cyclic loaded pressure vessels see also EN 13445-3:2026 and EN 13445-5:2026, Annex G in respect of peaking requirements. Peaking values in excess of the above are only permitted when supported by special analysis but in any case shall not exceed the values in Table 6.4-2.

Table 6.4-2 — Maximum permitted peaking *P* at longitudinal welds for vessels subject to predominantly non cyclic loads

Dimensions in millimetres

Vessel ratio wall thickness e to diameter D	Maximum permitted peaking P
$e/D \leq 0{,}025$	5
$e/D > 0{,}025$	10

See also EN 13445-5:2026 for testing group 4 vessels for additional limits on peaking.

6.4.5 Local thinning

6.4.5.1 Local areas of thickness below the values (e+c) where e is the required thickness and c is the corrosion allowance shall be permissible without further calculation provided all of the following conditions are fulfilled:

a) the wall thickness difference does not exceed the smaller of the two values 0,05 e or 5 mm;

b) the area of the thickness below the minimum design thickness shall be inscribed by a circle the diameter of which shall not exceed the smaller of the two values e or 60 mm;

c) the distance between two areas from edge to edge of wall thickness below the minimum design thickness shall be at least the width

$$\sqrt{D \cdot e}$$

where

D is equal to the external diameter of the pressure part;

e is the required thickness of the plate;

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d) the total area of thickness below the minimum design thickness shall not exceed 2 % of the total surface;

e) the area is not in the knuckle region of a dished end.

6.4.5.2 Furthermore, local areas of wall thickness smaller than the minimum design wall thickness shall be permissible provided:

a) the diameter of a circumscribed circle of the area with a wall thickness below the minimum design wall thickness has no larger dimension than that of a calculated permissible unreinforced opening according to EN 13445-3:2026 with a maximum of 200 mm;

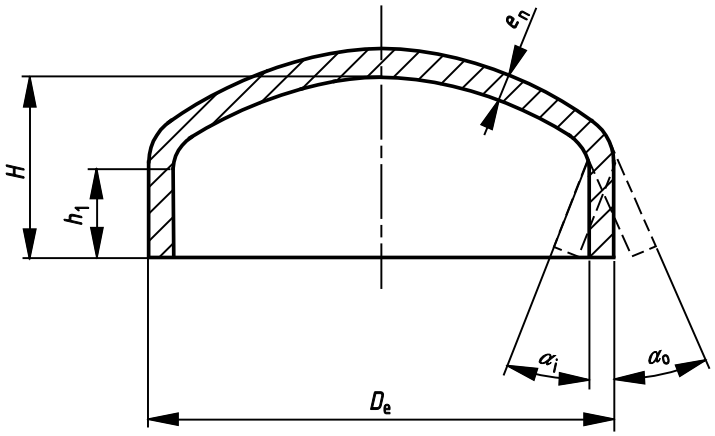
b) the residual wall thickness is greater than the thickness of a flat end of the same diameter and calculated with a C-factor of 0,35;

c) the areas of reduced wall thickness are recorded.

6.4.6 Dished ends

Dished ends (see Figure 6.4-2) shall be aligned with the tolerances specified in Table 6.4-3 except that the crown radius shall not be greater than that specified in the design and the knuckle radius shall not be less than the values specified in the design.

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Symbol	Quantity	Unit
D_e	Outside diameter	mm
H	Inner high	mm
h_1	Straight flange	mm
e_n[a]	Nominal wall thickness	mm
α_i	Deviation of straight flange from cylindrical shape inner side angle	degree
α_o	Deviation of straight flange from cylindrical shape outer side angle	degree
C	Circumference	mm
O	Out of roundness $O = \frac{2 \cdot (D_{max} - D_{min})}{D_{max} + D_{min}} \cdot 100$	%

[a] In place of the nominal wall thickness e_n, dished ends can be ordered with minimum wall thickness: $e_{min} = e_n - \delta_e$. For e_n and δ_e refer to EN 13445-3:2026, 5.2.3.

Figure 6.4-2 — Tolerances for dished ends

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Table 6.4-3 — Dished end tolerances

<table>
<tr><th>Symbol</th><th>Range of application</th><th>Limit deviations</th><th colspan="2">Notes</th></tr>
<tr><td rowspan="8">C</td><td>$D_e \leq 300$ mm</td><td>± 4 mm</td><td colspan="2" rowspan="9"></td></tr>
<tr><td>Ferritic materials:</td><td></td></tr>
<tr><td>300 mm < $D_e \leq 1\,000$ mm</td><td>± 0,4 %</td></tr>
<tr><td>1 000 mm < D_e</td><td>± 0,3 %</td></tr>
<tr><td>Austenitic materials:</td><td></td></tr>
<tr><td>D_e > 300 mm</td><td>+ 0,5 % / - 0,7 %</td></tr>
<tr><td>Clad materials:</td><td></td></tr>
<tr><td>D_e > 300 mm</td><td>± 1 %</td></tr>
<tr><td>O</td><td>all</td><td>≤ 1 %</td></tr>
<tr><td>H</td><td>all</td><td>the greater of
+ 0,015 · D_e
or + 10 mm</td><td colspan="2"></td></tr>
<tr><td rowspan="4">e_n</td><td>$e_n \leq 10$ mm</td><td>- 0,3 mm</td><td colspan="2" rowspan="4">If minimum wall thickness e_{min} for the dished end is specified no negative tolerance (δ_e) in thickness is permissible.</td></tr>
<tr><td>10 mm < $e_n \leq 30$ mm</td><td>- 0,5 mm</td></tr>
<tr><td>30 mm < $e_n \leq 50$ mm</td><td>- 0,8 mm</td></tr>
<tr><td>e_n > 50 mm</td><td>- 1,0 mm</td></tr>
<tr><td>α_i
α_o</td><td>all</td><td>≤ 2°
≤ 5°</td><td colspan="2">In case of dished ends where the outer side angle is influenced by an upsetting due to the forming process the deviation of the straight flange from the cylindrical shape shall be measured only on the inside of the dished end.</td></tr>
<tr><td colspan="5">If not otherwise specified in the drawing the length of the straight flange h_1 shall be as following:</td></tr>
<tr><td rowspan="5">h_1</td><td rowspan="5">all</td><td rowspan="5">$h_1 = 3 \cdot e_n$
or
$h_1 = 3 \cdot e_{min}$</td><td colspan="2">The length of the straight flange need, however, not be more than:</td></tr>
<tr><td>Wall thickness e_n or e_{min}
mm</td><td>Length of the straight flange
mm</td></tr>
<tr><td>50 < $e_n \leq$ 80</td><td>120</td></tr>
<tr><td>80 < $e_n \leq$ 100</td><td>100</td></tr>
<tr><td>100 < $e_n \leq$ 120</td><td>75</td></tr>
<tr><td>120 < e_n</td><td>50</td></tr>
</table>

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6.5 Tolerances for vessels subjected to external pressure

Tolerances shall be in accordance with EN 13445-3:2026, but in no case shall they exceed the tolerances specified in 6.4.

6.6 Structural tolerances

Structural tolerances, other than those specified in 6.4 and 6.5 should not exceed the values recommended in Annex A.

7 Weld details

7.1 General

The manufacturer in selecting an appropriate weld detail should give consideration to:

a) the method of manufacture;

b) the service conditions (e.g. corrosion);

c) the ability to carry out the necessary non-destructive testing required in accordance with EN 13445-5:2026;

d) the design requirements given in 5.7 and in Annex A of EN 13445-3:2026 for welds.

Other weld details may be used if they are described in EN 1708-1:2010 and EN 1708-3:2012 or if they are required due to design reasons. The selection of weld details shall be made in such a way that the testing required by the applicable testing group can be performed.

NOTE 1 Annex A of EN 13445-3:2026 gives figures of the joints in finished condition, design requirements mainly on geometry, a list of applicable testing groups, recommendations for prevention of lamellar tearing and corrosion.

NOTE 2 Basic weld details are given in EN 1708-1:2010. These details show sound and commonly accepted practice. It is not intended that these are considered mandatory or should restrict development of welding technology any way and as a result other suitable weld details may be used.

7.2 Vessels or parts made of more than one course

Where a vessel or vessel part is made of two or more courses the longitudinal weld joints of adjacent courses shall be staggered by $4 \cdot e$ with 10 mm minimum, or 30 mm minimum when the vessel or vessel part is either working in the creep range or designed by Design by Analysis – Direct Route (Annex B of EN 13445-3:2026) or designed using 6.3 of EN 13445-3:2026.

7.3 Lapped joints, joggle joints, permanent backing strips

Design and weld details shall be in accordance with EN 13445-3:2026, 5.7.

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