BS EN 13445-6:2026

BSI Standards Publication

Unfired pressure vessels

Part 6: Requirements for the design and fabrication of pressure vessels and pressure parts constructed from spheroidal graphite cast iron



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National foreword

This British Standard is the UK implementation of EN 13445-6:2026.It supersedes BS EN 13445-6:2021, which is withdraw.

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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Récipients sous pression non soumis à la flamme - Partie 6: Exigences pour la conception et la fabrication des récipients sous pression et des parties sous pression moulés en fonte à graphite sphéroïdal

Unbefeuerte Druckbehälter - Teil 6: Anforderungen an die Konstruktion und Herstellung von Druckbehältern und Druckbehälterteilen aus Gusseisen mit Kugelgraphit

This European Standard was approved by CEN on 24 June 2026.

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European foreword

This document (EN 13445-6:2026) 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of an identical text or by endorsement, at the latest by December 2026, and conflicting national standards shall be withdrawn at the latest by December 2026.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 13445-6:2021.

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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1 Scope

This document specifies requirements for the design, materials, manufacturing and testing of pressure vessels and pressure vessel parts intended for use with a maximum allowable pressure, PS, equal or less than:

— 100 bar when containing gases or liquids in group 1 or 2;

— 1 000 bar when containing liquids in group 2 only

and shell wall thicknesses not exceeding 60 mm, which are constructed of ferritic or austenitic spheroidal graphite cast iron. The thickness limitation of the shell does not apply to thickness of flanges, reinforcements, bosses, etc.

NOTE 1 Austenitic spheroidal graphite cast iron grades are principally used for high and low temperature applications and for their corrosion resistance properties.

NOTE 2 The allowable grades of spheroidal graphite cast iron are listed in Tables 5.1-1 and 5.1-2. Service conditions are given in Clause 4.

This document does not include lamellar graphite cast iron grades for ferritic and austenitic grades, with an elongation after fracture equal or less than 15 % which are explicitly excluded. Requirements for the use of cast irons with an elongation after fracture equal or less than 15 % are given in EN 15776.

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 287-6:2018, *Qualification test of welders — Fusion welding — Part 6: Cast iron*

EN 764-2:2012, *Pressure equipment — Part 2: Quantities, symbols and units*

EN 764-5:2014, *Pressure equipment — Part 5: Compliance and inspection documentation of materials*

EN 837-1:1996, *Pressure gauges — Part 1: Bourdon tube pressure gauges — Dimensions, metrology, requirements and testing*

EN 837-3:1996, *Pressure gauges — Part 3: Diaphragm and capsule pressure gauges — Dimensions, metrology, requirements and testing*

EN 1011-8: 2018, *Welding — Recommendations for welding of metallic materials — Part 8: Welding of cast irons*

EN 1369:2012, *Founding — Magnetic particle testing*

EN 1370:2011, *Founding — Examination of surface condition*

EN 1371-1:2011, *Founding — Liquid penetrant testing — Part 1: Sand, gravity die and low pressure die castings*

EN 1559-1:2011, *Founding — Technical conditions of delivery — Part 1: General*

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EN 1559-3:2011, *Founding — Technical conditions of delivery — Part 3: Additional requirements for iron castings*

EN 1563:2018, *Founding — Spheroidal graphite cast irons*

EN 12680-3:2011, *Founding — Ultrasonic testing — Part 3: Spheroidal graphite cast iron castings*

EN 12681-1:2017, *Founding — Part 1: Film techniques*

EN 12681-2:2017, *Founding — Part 2: Radiographic testing — Techniques with digital detectors*

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

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

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

EN 13835:2012, *Founding — Austenitic cast irons*

EN ISO 945-1:2019, *Microstructure of cast irons — Part 1: Graphite classification by visual analysis* (ISO 945-1:2019)

EN ISO 8062-1:2007, *Geometrical product specifications (GPS) — Dimensional and geometrical tolerances for moulded parts — Part 1: Vocabulary* (ISO 8062-1:2007)

EN ISO 8062-3:2023, *Geometrical product specifications (GPS) — Dimensional and geometrical tolerances for moulded parts — Part 3: General dimensional and geometrical tolerances and machining allowances for castings* (ISO 8062-3:2023)

EN ISO 15614-3:2008, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 3: Fusion welding of non-alloyed and low-alloyed cast irons* (ISO 15614-3:2008)

3 Terms, definitions units and symbols

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

3.1.1
critical zone
highly stressed area where a fracture is expected to occur in a burst test or where surface fatigue cracks are expected to be initiated due to fluctuating pressure loads

Note 1 to entry: Critical zones occur, for example, by any of the following:

— sudden change in cross section;

— sharp edges;

— sharp radii;

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— peak stresses;

— bending stresses;

— stresses due to other than membrane stress;

— changes in curvature.

Note 2 to entry: A critical zone is analysed by any appropriate method, e.g. holographic, interferometric, strain gauge methods, burst test, fatigue testing, FEM analysis, etc.

Note 3 to entry: Additionally, thermal gradients and thermal stresses due to different operating wall temperatures need to be considered in defining critical zones.

3.1.2
purchaser
individual or organization that buys pressure equipment, including assemblies or parts, for its own use or on behalf of the user and/or operator

3.1.3
manufacturer
individual or organization responsible for the design, fabrication, testing, inspection, installation of pressure equipment and assemblies where relevant

Note 1 to entry: The manufacturer may subcontract one or more of the above mentioned tasks under its responsibility.

3.1.4
casting manufacturer
subcontractor that produces the castings used in the manufacture of pressure equipment

3.1.5
testing factor
reduction factor applied to the nominal design stress to take account of possible manufacturing deficiencies

3.1.6
temperature factor
reduction factor applied to the 0,2 % proof strength to take account of temperature influence

3.1.7
wall thickness factor
reduction factor applied to the nominal design stress to take account of reduced mechanical properties

3.1.8
ferritic spheroidal graphite cast iron
cast material, iron and carbon based (carbon being present mainly in the form of spheroidal graphite particles) with a predominantly ferritic matrix

3.1.9
austenitic spheroidal graphite cast iron
cast material with an austenitic matrix which is iron and carbon based and alloyed with nickel and manganese, copper and/or chromium in order to stabilize the austenitic structure at room temperature

3.2 Units

For the purposes of this document, the units given in EN 764-2:2012 apply.

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3.3 Symbols

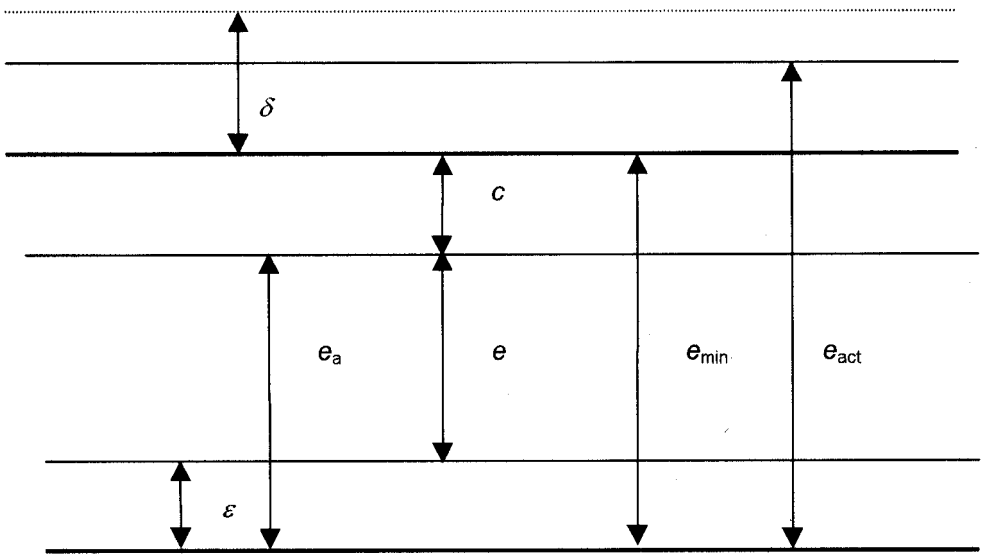
Symbols used in this document are listed in Table 3.3-1.

Table 3.3-1 — Symbols

Symbol	Quantity	Unit
c	Corrosion allowance	mm
e	Required thickness	mm
e_a	Analysis thickness	mm
e_{act}	Actual thickness	mm
e_{min}	Minimum thickness as specified on drawing	mm
E	Modulus of elasticity	MPa
f	Nominal design stress	MPa
F	Fatigue factor related to 99,8 % survival	—
$P_{b,act}$	Actual burst test pressure	MPa[a]
P_b	Minimum required bursting pressure	MPa [a]
P_d	Design pressure	MPa [a]
PS, P_s	Maximum allowable pressure	MPa [a]
PT, P_t	Test pressure	MPa [a]
RM	Material strength parameter	MPa
$R_{p0,2}$	0,2 %-proof strength	MPa
R_m	Tensile strength	MPa
$RM3$	Average material strength from 3 test samples for DBE purposes	MPa
TS_{min} , TS_{max}	Minimum / maximum allowable temperature	°C
T	Calculation temperature	°C
v	Volume	L
C_e	Wall thickness factor	—
C_T	Temperature factor	—
C_Q	Testing factor	—
n	Factor depending on shape of shell	—
f_e	Thickness correction factor	—
f_m	Mean stress correction factor	—
f_s	Surface finish correction factor	—
S	Safety factor	—
γ_R	Partial safety factor	—
δ	Casting tolerance	mm
ε	Extra thickness due to casting process	mm
ν	Poisson's ratio	—
[a] MPa for calculation purpose only, otherwise the unit is bar (1 MPa = 10 bar)		

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3.4 Inter-relation of thicknesses definitions



Key

e is the required thickness
e_a is the analysis thickness
e_{min} is the minimum thickness including corrosion allowance as indicated on drawings
e_{act} is the actual thickness
c is the corrosion allowance
ε is the extra thickness due to casting process
δ is the casting tolerance

Figure 3.4-1 — Inter-relation of thicknesses definitions

4 Service conditions

4.1 Cyclic loading

Spheroidal graphite cast iron pressure vessels and vessel parts can be used for cyclic operation if the stress factor is limited to 3. If the calculated number of cycles is close to a limit number of cycles mentioned in Table 4.1-1 below to determine the need for fatigue analysis, a worst-case model shall be implemented for this determination.

If it is expected that under service conditions the maximum number of full pressure cycles will exceed the limit number according to Table 4.1-1, or exceeds more than the equivalent number of cycles with smaller amplitude, then a fatigue analysis shall be performed according to Annex D.

Table 4.1-1 — Number of full pressure cycles for cyclic loading consideration

Testing factor	Maximum number of full pressure cycles without mandatory fatigue analysis according to Annex D	
$C_Q = 0,9$	1 000	
$C_Q = 0,8$	40 000	if 2,5 < stress factor ≤ 3
	200 000	If stress factor ≤ 2,5

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NOTE 1 A testing factor of 0,9 implies the application of higher nominal design stresses and consequently results in a lower maximum number of full pressure cycles without mandatory fatigue analysis.

NOTE 2 A stress factor (ratio of peak stress to fatigue stress) of more than 3, determined by any of the design methods given in 5.2 can be the result of inappropriate design. By enlarging radii or other small changes, an acceptable design can be generated.

For pressure cycles at a pressure difference ΔP_i less than the full pressure, the number of equivalent full cycles is given by Formula (4.1-1):

$$n_{eq} = \sum_{i=1}^{i=N} n_i \cdot \left(\frac{\Delta P_i}{P_{max}} \right)^{8,6} \quad (4.1\text{-}1)$$

where

N is the total number of envisaged types of pressure cycles with different amplitude;

n_i is the number of cycles of amplitude ΔP;

ΔP_i is the pressure cycle amplitude;

P_{max} is the maximum permissible pressure, as defined in EN 13445-3:2026, 3.15.

4.2 Limitations on temperature and energy content

The minimum and maximum allowable temperatures TS_{min} and TS_{max} shall be in accordance with the limits given in Tables 5.1-1 and 5.1-2.

The product $PS \cdot V$ for a single casting shall not exceed 100 000 bar·L.

5 Requirements

5.1 Materials

All cast iron grades subject to internal or external pressure shall comply with EN 1563:2018 for ferritic spheroidal graphite cast iron and EN 13835:2012 for austenitic spheroidal graphite cast iron.

The material grades listed in Table 5.1-1 and Table 5.1-2 may be produced in the as-cast or heat-treated condition (see EN 1563:2018, Clause 6).

The ferritic material grades given in Table 5.1-1 shall be used for applications where the minimum allowable temperature is higher or equal to –10 °C.

The material grades listed in Table 5.1-2 are intended for low temperature or high temperature design conditions.

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Table 5.1-1 — Allowable material grades for usual design temperatures (-10 °C up to 300 °C)

Material standard	Material designation[a]		Design temperature limits °C
	Symbol	Number	
EN 1563:2018	EN-GJS-350-22-RT	5.3101	-10 ≤ TS ≤ 300
	EN-GJS-350-22	5.3102	-10 ≤ TS ≤ 300
	EN-GJS-400-18-RT	5.3104	-10 ≤ TS ≤ 300
	EN-GJS-400-18	5.3105	-10 ≤ TS ≤ 300
	EN-GJS-450-18	5.3108	-10 ≤ TS ≤ 300
[a] When materials specified in these tables are not available, other suitable materials may be used when the technical documentation defining the characteristics of the materials has been accepted in accordance with the requirements for European approval for materials (EAM) or particular material appraisal (PMA).			

Table 5.1-2 — Allowable material grades for low or high temperature design conditions

Material standard	Material designation[a]		Design temperature limits °C
	Symbol	Number	
EN 1563:2018	EN-GJS-350-22-LT	5.3100	-40 ≤ TS ≤ 300
	EN-GJS-400-18-LT	5.3103	-20 ≤ TS ≤ 300
EN 13835:2012	EN-GJSA-XNiMn23-4	5.3501	-196 ≤ TS ≤ 300
	EN-GJSA-XNi22	5.3503	-40 ≤ TS ≤ 540
	EN-GJSA-XNiMn13-7	5.3506	-40 ≤ TS ≤ 300
[a] When materials specified in these tables are not available, other suitable materials may be used when the technical documentation defining the characteristics of the materials has been accepted in accordance with the requirements for European approval for materials (EAM) or particular material appraisal (PMA).			

Material grades EN-GJS-350-22-LT or EN-GJS-350-22U-LT can be used at design temperatures down to –60 °C. When used between (–40 ± 2) °C and (–60 ± 2) °C, impact testing at the minimum design temperature shall be:

— mean value from 3 tests 12 J for e_{act} ≤ 60 mm;

— 10 J for 60 mm ≤ e_{act} ≤ 200 mm;

— individual value 9 J for e_{act} ≤ 60 mm and 7 J for 60 mm ≤ e_{act} ≤ 200 mm.

The applicable requirements for the delivery conditions given in EN 1559-1:2011 and EN 1559-3:2011 shall also apply.

NOTE The use of materials working in the creep domain is not applicable to this standard since stress ranges are limited to elastic behaviour.

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5.2 Design

5.2.1 Technical documentation

The manufacturer shall document those items listed in EN 13445-5:2026, Clause 5 prior to fabrication.

5.2.2 Design methods

5.2.2.1 Generality

5.2.2.1.1 Principle

The loadings to be accounted for shall be in accordance with EN 13445-3:2026, Clause 5.

The service conditions of Clause 4 shall be accounted for.

Design methods shall be in accordance with this document and, when applicable, with the relevant clauses of EN 13445-3:2026.

If the geometry of the component or the loading case do not allow calculation by the formulas given in EN 13445-3:2026 and Annex G, design by analysis (DBA) (see Annex E) or design by experiment (DBE) (see Annex H) shall be applied.

Depending on the complexity of the component, the loading conditions and the level of NDT testing, the designer may choose one of the following available design methods mentioned below. Guidance is given on the correlation between safety factor, testing factor and the method to assess dynamic loading (see Table 5.2-1).

NOTE 1 Testing factors (0,8 or 0,9) are already accounted for in determining nominal design stress in 5.2.2.2 of this Part 6.

NOTE 2 For non-circular sections (rectangular sections), see EN 13445-3:2026, Clause 15 (see remark about fatigue design and radius requirements in 5.2.2.7).

5.2.2.1.2 Static loading

In order to design the part for static loading, the following options can be considered by the designer.

5.2.2.1.2.1 Design by formula (DBF)

Formulae for the calculation of the various components of the pressure part are given in EN 13445-3:2026 and Annex G. Annex G gives additional formulae for non-standard shaped parts often used in casting design.

5.2.2.1.2.2 Design by analysis (DBA)

The following applies:

a) decide whether the direct route (limit load – EN 13445-3:2026, Annex B) or the stress categorization method (EN 13445-3:2026, Annex C) will be followed. Decide whether linear or non-linear approach will be used;

b) base modelling and interpretation of calculation results shall be based on analysis thicknesses (e_a) and material characteristics at operation temperature;

c) for interpretation of calculation results, follow the evaluation procedures and assessment criteria in order to evaluate the fitness for purpose of the real structure. These design checks and related procedures are typical for the failure mode to be dealt with. For the different failure modes see EN 13445-3:2026.

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5.2.2.1.2.3 Design by experiment (DBE)

Where design by formulae according to EN 13445-3:2026 is not considered appropriate due to complex shape of the component, then a hydraulic burst test to determine the analysis thickness ea and the minimum thickness e_{min} shall be performed according to the procedure in 5.2.2.1.6. This test is also a part of the technical documentation.

This design method may be used without additional calculations if $P_d \cdot V < 60\ 00$ bar·L.

If $P_d \cdot V > 6\ 000$ bar·L for the complete vessel, this method can be used in addition to DBA or DBF.

The minimum required thickness at a specific location is given by:

$$e_a = e_{act} \cdot \left(\frac{S \cdot PS \cdot RM3}{P_{b,act} \cdot R_{p0,2} \cdot C_Q \cdot C_T \cdot C_e} \right)^{1/n} \quad (5\text{-}1)$$

$$e_{min} \geq e_a + c \quad (5\text{-}2)$$

where

$e_{act.}$ is the minimum measured wall thickness at the specific location;

$R_{p0,2}$ is in accordance with Annex A;

$P_{b,act}$ is the actual obtained value of burst pressure or the highest pressure during the test;

$n = 1$ for curved surfaces (cylinders, spheres) or cones with angles $\alpha \leq 60°$, stayed surfaces and stressed parts if bending stress is less than 2/3 of the total stress;

$n = 2$ for all other surfaces.

For determining *RM3* three tensile test specimens shall be performed in accordance with EN 1563:2018 or EN 13835:2012 material standards for each of the required positions taken from the same cast.

The specimen positions shall be in accordance with the specifications in the technical delivery conditions of the product form for materials for pressure equipment. In addition to the requirements of the material standards, the manufacturer and the purchaser may agree on the properties required at stated positions in the casting. These properties shall be determined by testing machined test pieces cut from the casting at these stated positions. The mean value of the three specimens shall be used to determine the ratio of *RM3*/*R*m.

Specimens may be taken before the burst test on an identical part or on the same part after burst test. It is not allowed to use scaled-down part of the part under investigation.[1]

[1] When taking values after burst testing these may show lower tensile strength properties for some grades and should only be used with caution in exceptional cases (single part or very large part, etc.)

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The position on the casting from where the sample is cut shall be in an area where the casting wall thickness is close to the relevant wall thickness of the casting. For the purpose of determining the size of the test pieces to be used, the purchaser shall, by the time of acceptance of the order, indicate to the manufacturer which are the important sections. In the absence of any direction by the purchaser, the manufacturer may choose the size of the test piece to be used according to the relevant standard.

No specimen may show a lower value than the minimum value of *R*m stated in the respective material standards of the material grade under investigation, taking into account the corresponding thickness.

The preferred test piece diameter is 14 mm, but, for technical reasons and for test pieces machined from castings, it is permitted to use a test piece of different diameter or equivalent diameter.

Retesting shall be carried out if a test is not valid. A test is not valid if there is:

— a faulty mounting of the test piece or defective operation of the test machine;

— a defective test piece because of incorrect pouring or incorrect machining;

— a fracture of the tensile test piece outside the gauge length;

— a casting defect in the test piece, evident after fracture.

In all cases, a new test piece shall be taken from the same sample or a duplicate sample cast at the same time. The result of the retest shall be used.

5.2.2.1.2.4 Determination of the hydraulic burst pressure and maximum allowable pressure for static loading

A random sample from the production of the vessel or vessel part shall be taken for the burst test or to determine the maximum allowable working conditions. The procedure shall be as follows:

a) verify that the part or vessel to be tested is cast according to the specified drawing and any revision thereof. The material used shall be the same type and grade as for the production part;

b) verify that the part or vessel is machined to the same dimensions as the production part;

c) verify that the material properties meet the requirements of 5.1. For each casting used for the burst test, 3 test pieces for tensile testing, and, if applicable, for impact testing, shall be separately cast and tested. The results and the calculated average tensile strength shall be certified in accordance with 6.5;

d) the wall thicknesses of the entire casting shall be measured (at least one measurement per 100 mm x 100 mm). The results shall be marked on the casting at the location of the measurement or on the drawing;

e) verify that a calibrated pressure gauge is used; maximum tolerance shall conform to at least class 1 or better according to EN 837-1:1996 and EN 837-3:1996. The scale of the pressure gauge shall be approximately 4/3 of the anticipated burst pressure;

f) the pressure shall be increased in a controlled manner until the minimum required burst pressure is obtained:

$$P_b \geq PS \cdot \frac{RM3}{f}\left(\frac{e_{act}}{e_{\min} - c}\right)^n \qquad (5\text{-}3)$$

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The pressure shall be increased further in a controlled manner until rupture occurs. Record burst pressure $P_{b,act}$, test date, material specification, details of material, part number, and wall thickness e_{act} measured at burst location. A relation with the actual burst pressure $P_{b,act}$, which can be higher than P_b on account of a better stress distribution, and the maximum allowable pressure PS, can be deducted according the converted Formula (5-3), replacing P_b by $P_{b,act}$

$$PS \le P_{b,act} \cdot \frac{f}{RM3}\left(\frac{e_{\min} - c}{e_{act}}\right)^n \qquad (5\text{-}4)$$

g) if a part fails to meet any of those requirements, a second identical production part may undergo the same test procedure. If this second part meets the test requirements, this part may be accepted after investigation of the cause of failure of the first part. If the second part does not meet the test requirements, the design of the part shall be deemed not to conform to the specification;

h) during the burst test, it is acceptable for leaks and lack of pressure tightness to occur between flanged, gasketed or bolted parts as long as the pressure P_b can be reached during the test. It is acceptable for gasket(s) to break during the burst test; their characteristics may be modified without unduly changing flange load properties as long as their design meets the design rules of EN 13445-3:2026 for the anticipated maximum allowable pressure P_S;

i) only for the test, bolts of higher mechanical strength than required by the design specification may be accepted;

j) when flanged connections are designed according to the requirements of EN 13445-3:2026 with respect to minimum required thickness, minimum required bolt area and shape, it is acceptable, in order to reach burst test pressure, to install extra bolts in addition to the number specified for production;

k) the rupture under test pressure or any hydraulic test shall not be performed by means of a construction on a hydraulic press that can counteract the free shell bending under pressure.

5.2.2.1.3 Dynamic loading

5.2.2.1.3.1 General

If the number of full pressure cycles or equivalent full pressure cycles according to Formula (4.1-1) exceeds the number of full pressure cycles for static loading considered in Table 4.1-1, a fatigue assessment of the complete design is required. In order to design the part for dynamic loading, the following options can be considered by the designer.

5.2.2.1.3.2 Simplified fatigue assessment (SFA)

A simplified fatigue assessment will return a value of maximum allowable number of equivalent pressure fluctuations under service conditions. The assessment shall be performed according to Annex D. A maximum stress factor of 3 is pre-supposed, unless for construction details as limited in Table D.1A where equal or lower values than 3 may be used.

This Table D.1A may also be used for other metallic castings than spheroidal graphite cast iron (e.g. cast steel, cast aluminium and so on).

The simplified fatigue assessment may be used for vessels with a testing factor C_Q=0,8 or vessels with a testing factor C_Q=0,9.

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