



BSI Standards Publication

## Shell boilers

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Part 1: General

## National foreword

This British Standard is the UK implementation of EN 12953-1:2025. It supersedes BS EN 12953-1:2012, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PVE/2, Water Tube And Shell Boilers.

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

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Date

Text affected

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English Version

## Shell boilers - Part 1: General

Chaudières à tubes de fumée - Partie 1: Généralités

Großwasserraumkessel - Teil 1: Allgemeines

This European Standard was approved by CEN on 15 September 2025.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
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## European foreword

This document (EN 12953-1:2025) has been prepared by Technical Committee CEN/TC 269 “Shell and water-tube boilers”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by May 2026, and conflicting national standards shall be withdrawn at the latest by May 2026.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 12953-1:2012.

Annex E provides details of the significant technical changes between this document and EN 12953-1:2012.

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.

The series concerning shell boilers consists of the following parts:

- *Part 1: General*
- *Part 2: Materials for pressure parts of boilers and accessories*
- *Part 3: Design and calculation for pressure parts*
- *Part 4: Workmanship and construction of pressure parts of the boiler*
- *Part 5: Inspection during construction, documentation and marking of pressure parts of the boiler*
- *Part 6: Requirements for equipment for the boiler*
- *Part 7: Requirements for firing systems for liquid and gaseous fuels for the boiler*
- *Part 8: Requirements for safeguards against excessive pressure*
- *Part 9: Requirements for limiting devices of the boiler and accessories*
- *Part 10: Requirements for boiler feed water and boiler water quality*
- *Part 11: Acceptance tests*
- *Part 12: Requirements for firing systems for solid fuels for the boiler*
- *Part 13: Operating instructions*

Although these parts can be obtained separately, it is recognized that the parts are inter-dependent. As such, the design and manufacture of shell boilers requires the application of more than one part in order for the requirements of the standard to be satisfactorily fulfilled.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

## 1 Scope

This document is applicable to shell boilers with volumes in excess of 2 l for the generation of steam and/or hot water at a maximum allowable pressure greater than 0,5 bar and with a temperature in excess of 110 °C.

For the purpose of this document the following pressurized parts are included:

- the shell boiler as one entity of pressure equipment including all the pressure parts from the feedwater/hot water inlet (including the inlet valve) up to and including the steam/hot water outlet (including the outlet valve or, if there is no valve, the first circumferential weld or flange downstream of the shell boiler or if applicable the outlet header);
- all superheaters, economizers and interconnecting piping;
- additionally, the piping that is connected to the boiler involved in services such as draining, venting, desuperheating, etc., up to the first isolating valve or, if there is no valve, the first circumferential weld or flange downstream of the shell boiler or if applicable the outlet header/piping.

This document does not apply to the following types of boilers and equipments:

- a) water-tube boilers;
- b) non-stationary boilers, e.g. locomotive boilers;
- c) thermal oil boilers;
- d) boilers where the main pressure housing is made of cast material;
- e) pumps, gaskets, etc;
- f) brickwork setting and insulation, etc.

NOTE 1 Further information on shell boilers is given in Annex A.

NOTE 2 Stainless steel boilers are covered by EN 14222:2021.

## 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 764-1:2015+A1:2016, *Pressure equipment — Part 1: Vocabulary*

EN 12953-2:2025, *Shell boilers — Part 2: Materials for pressure parts of boilers and accessories*

EN 12953-3:2016,<sup>1</sup> *Shell boilers — Part 3: Design and calculation for pressure parts*

EN 12953-4:2018, *Shell boilers — Part 4: Workmanship and construction of pressure parts of the boiler*

EN 12953-5:2020, *Shell boilers — Part 5: Inspection during construction, documentation and marking of pressure parts of the boiler*

EN 12953-6:2024, *Shell Boilers — Part 6: Requirements for equipment for the boiler*

EN 12953-7:2002, *Shell boilers — Part 7: Requirements for firing systems for liquid and gaseous fuels for the boilers*

EN 12953-8:2001, *Shell boilers — Part 8: Requirements for safeguards against excessive pressure*

EN 12953-9:2024, *Shell boilers — Part 9: Requirements for limiting devices of the boiler and accessories*

EN 12953-10:2003, *Shell boilers — Part 10 : Requirements for feedwater and boiler water quality*

EN 12953-11:2003, *Shell boilers — Part 11: Acceptance tests*

EN 12953-12:2003, *Shell boilers — Part 12: Requirements for grate firing systems for solid fuels for the boiler*

EN 12953-13:2012, *Shell boilers — Part 13: Operating instructions*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 764-1:2015+A1:2016 and the following apply.

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

— ISO Online browsing platform: available at <https://www.iso.org/obp>

— IEC Electropedia: available at <https://www.electropedia.org/>

### 3.1

#### **purchaser**

individual or organization that buys the boiler or part thereof from the manufacturer

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<sup>1</sup> Document impacted by EN 12953-3:2016/AC:2024.

### 3.2

#### **manufacturer**

individual or organization responsible for the design, fabrication, testing, installation where relevant, and compliance with the requirements of the relevant product standard, whether executed by him or a subcontractor

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

Note 2 to entry: In EU member states the manufacturer is responsible for compliance with the Pressure Equipment Directive 2014/68/EU. For those manufacturers outside of the EU, their authorized representative inside the EU assumes this responsibility.

Note 3 to entry: The installer (for example reseller, end user, installation contractor, etc.) can be considered as a manufacturer, when he decided to place on the market an assembly.

[SOURCE: EN 764-1:2015+A1:2016, 3.5.5, with the addition of Note 3 to entry]

### 3.3

#### **material supplier**

individual or organization, not being a material manufacturer, that supplies material or prefabricated parts to be used in the construction of pressure components

Note 1 to entry: A material supplier can be a stockist.

[SOURCE: EN 764-1:2015+A1:2016, 3.5.7, with the addition of Note 1 to entry]

### 3.4

#### **material manufacturer**

individual or organization that produces material in the basic product form used in the manufacture of pressure components

[SOURCE: EN 764-1:2015+A1:2016, 3.5.6]

### 3.5

#### **installer**

individual or organisation that carries out the installation of the pressure equipment at the location where it is to be put into service

Note 1 to entry: Depending on the contractual circumstances, the installer can be considered as the manufacturer of the assembly.

### 3.6

#### **low pressure boiler**

##### **LPB**

steam boiler with a maximum saturation temperature of 120 °C (this corresponds to a pressure of 1 bar gauge) or hot water boiler with a maximum outlet temperature of 120 °C and a maximum allowable pressure of 10 bar gauge

Note 1 to entry: The manufacturer can have the option of using this document or alternatively EN 14394:2005+A1:2008 for low pressure boilers which are to be used as hot water heating boilers.

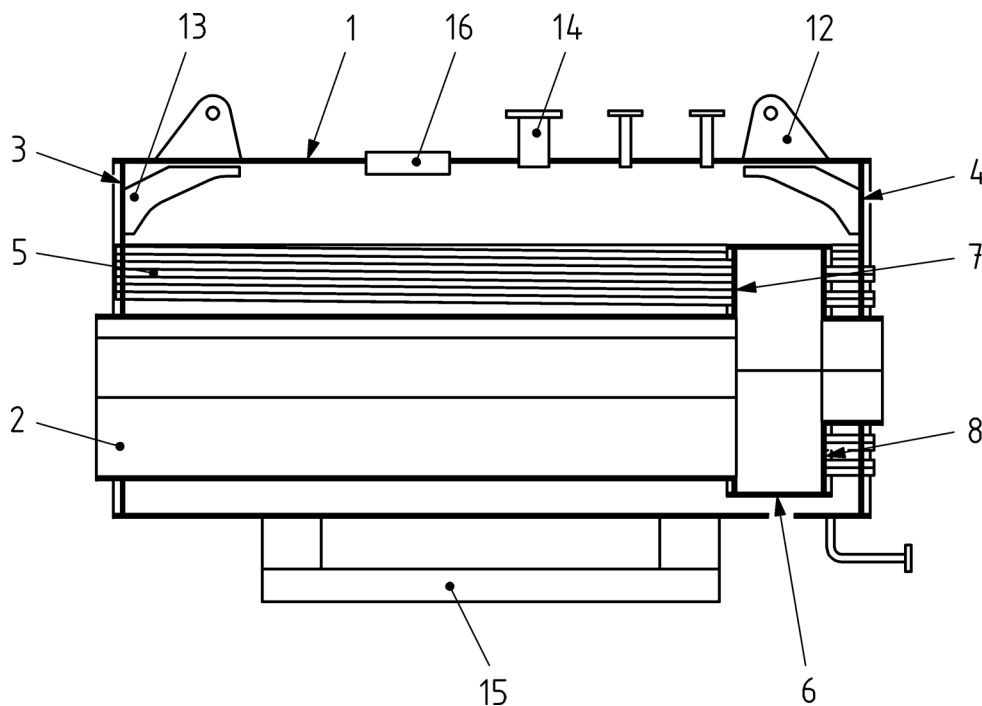
### 3.7 shell boiler

closed vessel containing water in which flames and/or hot gases pass through the inside of tubes located within the shell

Note 1 to entry: This is opposed to water-tube boiler where the water is inside the tubes and flue gas is outside the tubes.

Note 2 to entry: Figures 1 to 6 are typical configurations and examples of shell boilers. Other configurations are also permissible (e.g. vertical shell).

Note 3 to entry: Informative Annexes C and D give translations of some typical components of a shell boiler.



#### Key

- 1 cylindrical shell
- 2 furnace tube (1st pass): for example plain or corrugated or with bowling hoops
- 3 front tube plate (or front plate depending on the configuration)
- 4 rear plate (or rear tube plate depending on the configuration)
- 5 smoke tube(s) (2nd pass/3rd pass) (can be with stay tubes or bar stays)
- 6 wrapper plate (shell of reversal chamber)
- 7 reversal chamber tube plate
- 8 wet back rear plate
- 12 lifting lugs
- 13 gusset stays
- 14 branches
- 15 supports
- 16 inspection opening

NOTE The main pressure-bearing parts are the parts which constitute the envelope under pressure and the parts which are essential for the integrity of the boiler.

**Figure 1 — Typical components of a shell boiler**