SLOVENSKI STANDARD
SIST EN 12953-1:2002

01-november-2002

Mnogovodni kotli - 1. del: Splošno

Shell boilers - Part 1: General

Großwasserraumkessel - Teil 1: Allgemeines

Chaudieres a tubes de fumée - Partie 1: Généralités

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ICS:

27.060.30	Grelniki vode in prenosniki toplote	Boilers and heat exchangers

SIST EN 12953-1:2002 **en**

2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

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EUROPEAN STANDARD

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EUROPÄISCHE NORM

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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 14 March 2002.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

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Contents

page

Foreword 3

1 Scope 4
1.1 General 4
1.2 Boiler plants 4
1.3 Exclusions 7

2 Normative references 8

3 Terms and definitions 8

4 Symbols and abbreviations 10

5 Responsibilities 14
5.1 Responsibility of the purchaser 14
5.2 Responsibility of the manufacturer 14
5.3 Responsible authority 15

6 Interpretations 15

7 Design/type appraisal of pressure parts 15

Annex A (informative) Information to be supplied by the purchaser to the manufacturer 16

Annex B (informative) Guidance in the use of the conformity assessment procedures 18

Annex ZA (informative) Clauses of this European Standard addressing essential safety requirements or other provisions of the Pressure Equipment Directive 22

Bibliography 23

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SIST EN 12953-1:2002
https://standards.iteh.ai/catalog/standards/sist/51a41df4-0263-4a23-9588-6a2f08083b83/sist-en-12953-1-2002

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Foreword

This document EN 12953-1:2002 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 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 the Pressure Equipment Directive (PED) [1].

For the relationship with the Pressure Equipment Directive see informative annex ZA, which is an integral part of this document.

The European Standard EN 12953 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 feedwater and boiler water quality.*
- *Part 11: Acceptance tests.*
- *Part 12: Requirements for firing systems for solid fuels for the boiler.*
- *Part 13: Operating instructions.*

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CR 12953-14, *Shell boilers - Guideline for the involvement of an inspection body independent of the manufacturer*.

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Although these parts may be obtained separately, it should be 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 European Standard to be satisfactorily fulfilled.

The annexes A and B of this European Standard are informative.

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.

SIST EN 12953-1:2002

1 Scope

1.1 General

This European Standard specifies the design, construction, equipment, operational and water treatment requirements drawn up with a view to ensuring the operating safety of new stationary shell boiler plants.

This European Standard includes the requirements for the prevention of over-heating and inadmissible over-pressurisation.

1.2 Boiler plants

A boiler plant consists of:

a) the shell boiler including all pressure parts from the feedwater inlet (including the inlet valve) to the steam and/or hot-water outlet (including the outlet valve). This includes economisers, superheaters and associated connecting pipes which are heated by flue gas and are not separated from the main system by intervening shut-off devices. Also included is any piping connecting the boiler to and including the first isolating valve;

b) isolated economisers, superheaters and associated connecting pipes;

c) expansion vessels and/or expansion tanks for plants for hot water production;

d) thermal insulation and/or refractory and cladding;

e) installations for heat supply and heating;

f) installations for processing and feeding the fuel into the boiler;

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g) installations for the air supply of the boiler including the fans;

h) installations for the feedwater supply of the boiler;

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i) all control and safety systems.

This European Standard specifies requirements for both directly fired and electrically heated boilers including low pressure boilers (LPB, see 3.7) as well as for waste-heat boilers with a gas-side pressure not exceeding 0,5 bar[1)] of cylindrical design, constructed from carbon or carbon manganese steels by fusion welding and a design pressure not exceeding 40 bar[1)]. The boilers covered by this European Standard are intended for land use for providing steam or hot water (typical examples are shown in Figures 1.2-1 to 1.2-5).

Where a particular boiler is a combination of shell boiler and water-tube boiler design, then the water-tube boiler standard EN 12952 is used in addition to this European Standard. One such example of this combination is shown in Figure 1.2-2.

This European Standard applies to the boiler proper, from the feed-water inlet connection to the steam outlet connection and to all other connections, including the valves and steam and water fittings. If welded ends are used, the requirements specified herein begin or end at the weld where flanges, if used, would have been fitted.

This European Standard applies to boilers having a capacity of greater than 2 l, a maximum allowable pressure greater than 0,5 bar and with a maximum design temperature in excess of 110 °C.

For Low Pressure Boilers (LPB) less stringent requirements concerning design and calculation are acceptable. Details are defined in the respective clauses.

The boiler plant comprises, besides the boiler proper as described above, all pieces of equipment necessary for the intended mode of operation, for which requirements have been laid down in the different parts of this European Standard.

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1) For boilers operating at pressure greater than those stated the rules of this standard equally apply. However, it is generally considered that additional design analysis, inspection and testing may be necessary.

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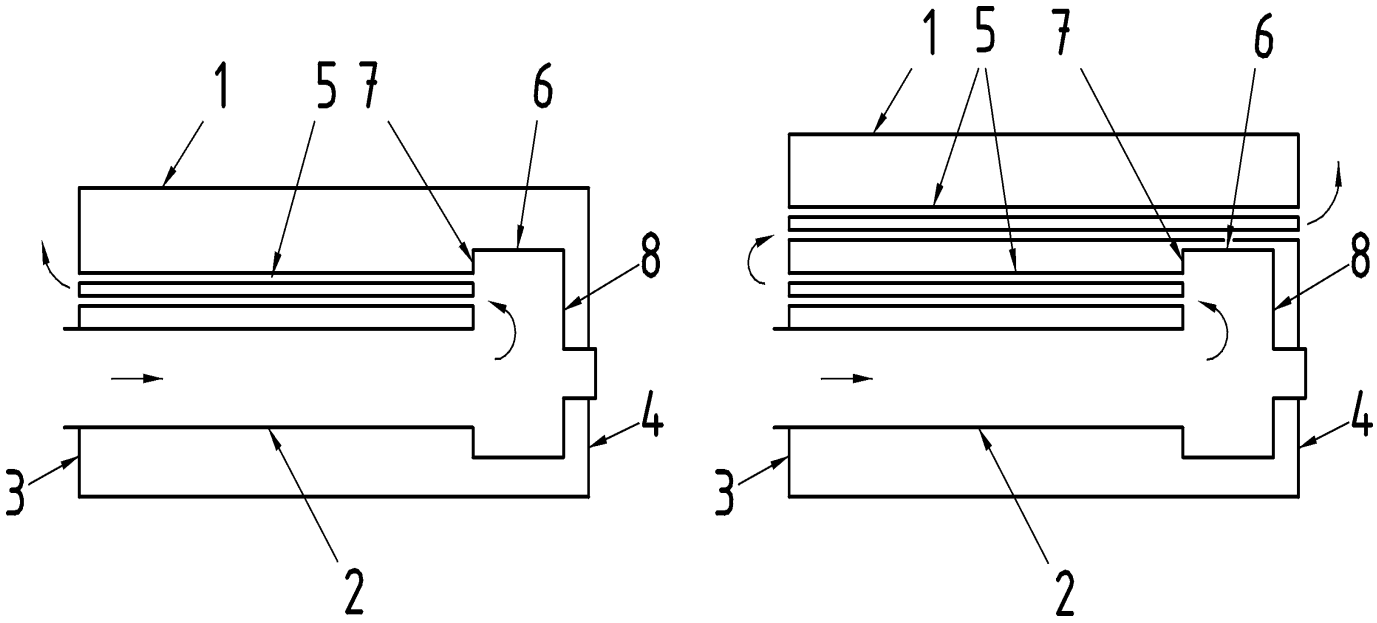

a) two pass boiler

b) three pass boiler

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Key

1 cylindrical shell
2 furnace tube (1st pass)
3 front tube plate
4 rear plate
5 smoke tube(s)
6 wrapper plate
7 reversal chamber tube plate
8 wet back rear plate
9 header
10 tube wall
11 refractory

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NOTE The effective radiant heating surface comprises the furnace tube and the surface of the reversal chamber, where applicable.

Figure 1.2-1 — Wet back boiler with internal reversal chamber

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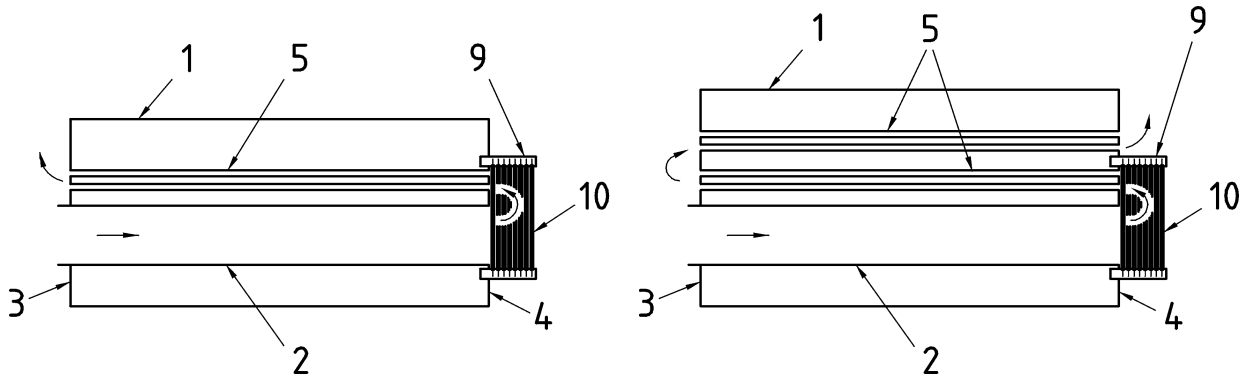
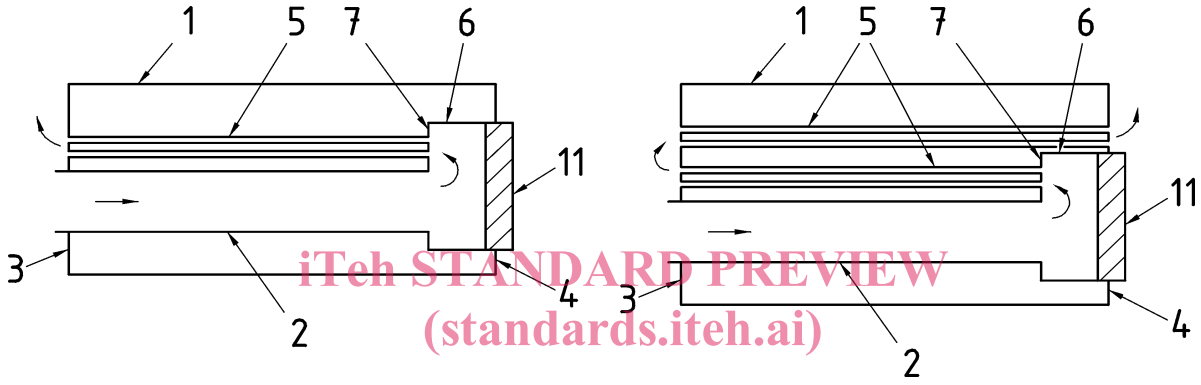


a) two pass boiler b) three pass boiler

NOTE The effective radiant heating surface comprises the furnace tube and complete surface of the reversal chamber.

Figure 1.2-2 — Wet back boiler with external reversal chamber



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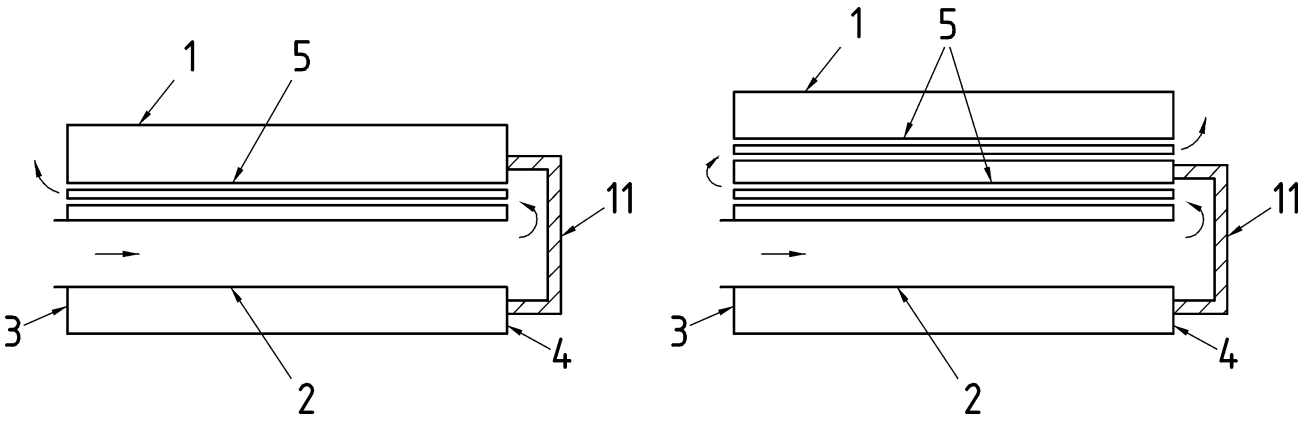
a) two pass boiler b) three pass boiler

NOTE The effective radiant heating surface comprises the furnace tube wrapper plate and reversal chamber tube plate.

Figure 1.2-3 — Semi-wet back boiler



a) two pass boiler b) three pass boiler

NOTE The effective radiant heating surface comprises the furnace tube and rear tube plate.

Figure 1.2-4 — Dry back boiler

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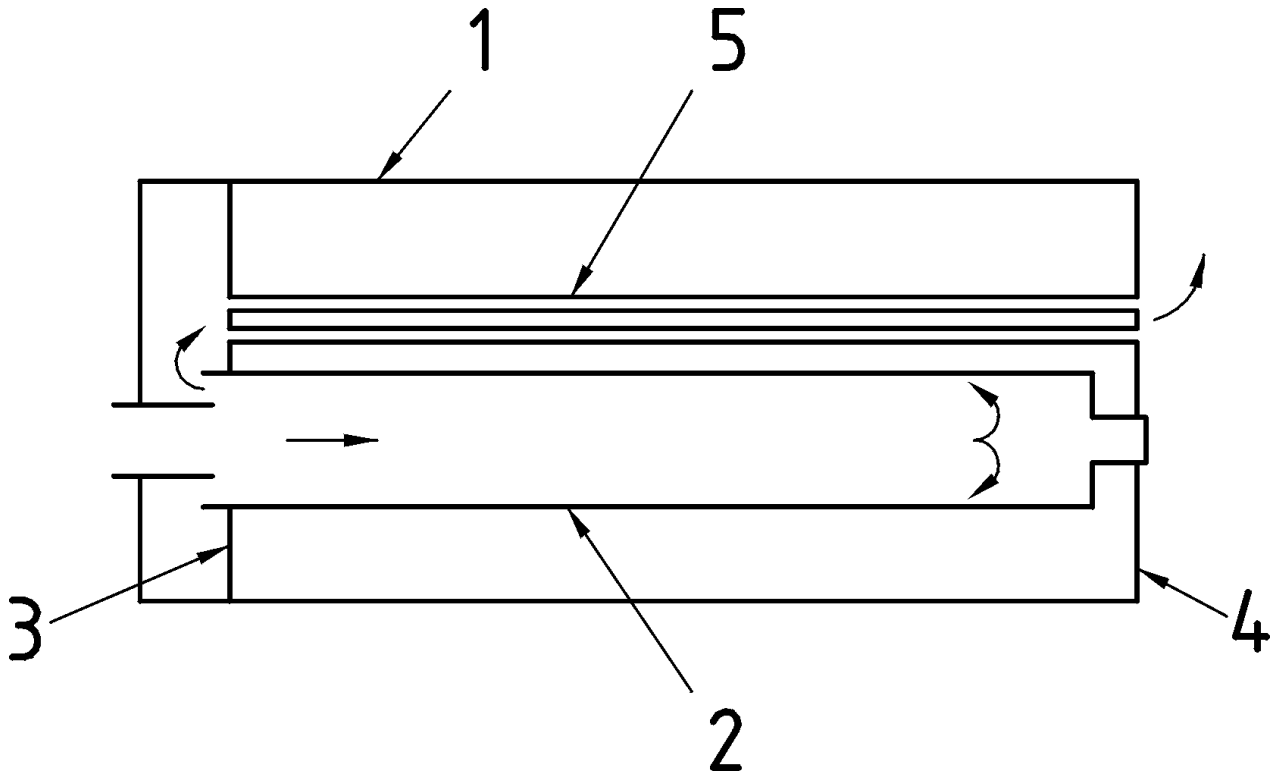

NOTE The effective radiant heating surface consists of the furnace only

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Figure 1.2-5 — Reverse flame boiler

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1.3 Exclusions

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This European Standard does not apply to water-tube boilers, coil boilers, to boilers for railway locomotives, or to marine boilers. This standard does not cover brickwork setting and insulation.

However, no construction code can be sufficiently detailed in order to guarantee, in all cases, the necessary operational safety. It is therefore the manufacturer's responsibility, in addition to complying with the requirements of this European Standard, to take into consideration the special measures which could be necessary in order to obtain the required level of safety.

Be that as it may, the safety and reliability of a boiler complying with the requirements of this standard and with the additional precautions which may possibly be taken by the manufacturer can only be guaranteed if the feedwater and boiler water are in accordance with the requirements of prEN 12953-10 and if the boiler is correctly operated and maintained. To achieve this, the instructions given by the manufacturer in the operating and maintenance manuals are followed.

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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 764, *Pressure equipment — Terminology and symbols — Pressure, temperature, volume.*

prEN 764-3:1998, *Pressure equipment — Part 3: Definition and parties involved.*

EN 12952, *Water-tube boilers and auxiliary installations.*

EN 12953-3:2002, *Shell boilers — Part 3: Design and calculation.*

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

CR 12953-14, S*hell boilers - Part 14: Guideline for the involvement of an inspection body independent of the manufacturer*.

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions of EN 764, prEN 764-3 and the following apply.

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3.1
purchaser
individual or organization that buys the completed boiler plant or part thereof from the manufacturer [EN 12952-1]

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3.2
manufacturer
individual or organization responsible for the design, fabrication, testing, installation where relevant, and compliance with the requirements of this standard whether executed by him or a subcontractor, see EN 12952-1

3.3
designer
individual or organization that, on behalf of the manufacturer, carries out the design of the boiler plant and the designer determines the shape, dimensions and thicknesses of the boiler plant components, selects the materials and details the methods of construction and testing [EN 12952-1]

3.4
material supplier
individual or organization, not being a material manufacturer, that supplies material or prefabricated parts to be used in the construction of the boiler plant or any component thereof [EN 12952-1]

3.5
material manufacturer
individual or organization that produces the basic material for the fabrication of boiler plant components or prefabricated standardized parts [EN 12952-1]

SIST EN 12953-1:2002

3.6
responsible authority
this standard identifies the involvement of competent organisations which are independent of the manufacturer. Such organisations may be notified bodies, recognised third-party organisations or user inspectorates. For the purpose of this standard all these organisations have been collectively termed responsible authorities (RA) (see also EN 12952-1)

NOTE 1 The definition of a notified body and the criteria controlling its operation are given respectively in article 12 and Annex IV of the Pressure Equipment Directive.

NOTE 2 The definition of a recognized third-party organisation and the criteria controlling its operation are given respectively in article 13 and Annex IV of the Pressure Equipment Directive.

NOTE 3 The definition of a user inspectorate and the criteria controlling its operation are given respectively in article 14 and annex V of the Pressure Equipment Directive.

NOTE 4 The responsibility of the manufacturer is described in 3.2.

3.7
low pressure boilers (LPB)
steam boilers with a maximum saturation temperature of 120 °C (this corresponds to a pressure of 1 bar gauge) or hot water generators with a maximum outlet temperature of 120 °C and a maximum allowable pressure of 10 bar gauge

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