



SLOVENSKI STANDARD

SIST EN 12953-2:2002

01-november-2002

Mnogovodni kotli - 2. del : Materiali za tlačno obremenjene dele in opremo kotla

Shell boilers - Part 2: Materials for pressure parts of boilers and accessories

Großwasserraumkessel - Teil 2: Werkstoffe für drucktragende Kesselteile und Zubehör

Chaudières a tubes de fumée - Partie 2: Matériaux des parties sous pression des chaudières et des accessoires

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Ta slovenski standard je istoveten z: **EN 12953-2:2002**

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ICS:

27.060.30	Grelniki vode in prenosniki toplote	Boilers and heat exchangers
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EUROPEAN STANDARD
NORME EUROPÉENNE
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English version

Shell boilers - Part 2: Materials for pressure parts of boilers and accessories

Chaudières à tubes de fumée - Partie 2: Matériaux des parties sous pression des chaudières et des accessoires

Großwasserraumkessel - Teil 2: Werkstoffe für drucktragende Kesselteile und Zubehör

This European Standard was approved by CEN on 14 March 2002.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

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.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document EN 12953-2:2002 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 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.*

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

Although these parts may be obtained separately, it should be recognised 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.

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.

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1 Scope

This European Standard covers the following materials for pressure parts of shell boilers subjected to internal and external pressure and their integral attachments:

- flat products;
- tubes; and
- forgings.

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 1561, *Founding — Grey cast irons.*

EN 1563, *Founding — Spheroidal graphite cast irons.*

EN 10028-1, *Flat products made of steels for pressure purposes — Part 1: General requirements.*

EN 10028-2, *Flat products made of steels for pressure purposes — Part 2: Non-alloy and alloy steels with specified elevated temperature properties.*

EN 10028-3, *Flat products made of steels for pressure purposes — Part 3: Weldable fine grain steels, normalized.*

EN 10204:1991, *Metallic products — Types of inspection documents.*

EN 10216-1, *Seamless steel tubes for pressure purposes — Technical delivery conditions — Part 1: Non-alloy steel tubes with specified room temperature properties.*

EN 10216-2, *Seamless steel tubes for pressure purposes — Technical delivery conditions — Part 2: Non-alloy and alloy steel tubes with specified elevated temperature properties.*

EN 10217-1, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 1: Non-alloy steel tubes with specified room temperature properties.*

EN 10217-2, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 2: Electric welded non-alloy and alloy steel tubes with specified elevated temperature properties.*

EN 10217-5, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 5: Submerged arc welded non-alloy and alloy steel tubes with specified elevated temperature properties.*

EN 10222-1, *Steel forgings for pressure purposes — Part 1: General requirements for open die forgings.*

EN 10222-2, *Steel forging for pressure purposes — Part 2: Ferritic and martensitic steels with specified elevated temperature properties.*

EN 10234, *Metallic materials — Tube — Drift expanding test.*

EN 10235, *Metallic materials — Tube — Flanging test.*

EN 12074, *Welding consumables — Quality requirements for manufacture, supply and distribution of consumables for welding and allied processes.*

EN 12953-5:2002, *Shell boilers — Part 5: Inspection during construction, documentation and marking of pressure parts of the boiler.*

prEN 13479-1, *Welding consumables — Test methods and quality requirements for conformity evaluation of consumables — Part 1: Primary methods and evaluation.*

CR ISO 15608, *Welding — Guidelines for a metallic material grouping system (ISO/TR 15608:2000).*

3 General requirements

3.1 Selection of materials

The manufacturer of the shell boiler shall select the materials for the manufacture of the boiler so that, when delivered, the material fulfils the requirements specified in the order and the requirements of all parts of this European Standard.

3.2 Material specification

3.2.1 General

The selection and order of materials for pressure parts shall be based on specifications in the form of:

- a) Harmonized European Standards (see 3.2.2);
- b) European Material Data Sheets¹⁾ (see 3.2.3);
- c) Particular Material Appraisals (see 3.2.4).

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¹⁾ EMDS are established on the basis of European Approvals for pressure equipment Materials (EAM).

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3.2.2 Harmonized European Standards

Steels shall be selected from the grades listed in Table 3.2-1, in accordance with the appropriate European Standards.

Table 3.2-1 — Permitted grades of EN steels

Product	Standard	Grade	Group ^a
Flat	EN 10028-2	P235GH	1.1
		P265GH	1.1
P295GH		1.2	
P355GH		1.2	
	EN 10028-3	P275NH	1.1
		P355NH	1.2
Tube (Seamless)	EN 10216-1 ^b	P195 TR1 or TR2	1.1
		P235 TR1 or TR2	1.1
P265 TR1 or TR2		1.1	
	EN 10216-2	P195 GH	1.1
		P235 GH	1.1
		P265 GH	1.1
Tube (Welded)	EN 10217-1 ^b	P195 TR1 or TR2	1.1
		P235 TR1 or TR2	1.1
P265 TR1 or TR2		1.1	
	EN 10217-2	P195 GH	1.1
		P235 GH	1.1
		P265 GH	1.1
	EN 10217-5	P235 GH	1.1
		P265 GH	1.1
Forging	EN 10222-2	P245GH	1.1
		P280GH	1.2
^a Material group to CR ISO 15608			
^b This material can only be used for smoke tubes (both plain and stay)			

3.2.3 European Material Data Sheets

European Material Data Sheets (EMDS) shall be applied for types of materials that are not covered in European material standards.

3.2.4 Particular Material Appraisals

Particular Material Appraisals (PMA) shall be applied for special cases not covered in 3.2.2 and 3.2.3 and not intended for frequent use. A PMA shall be prepared, and it shall be approved.

4 Materials for pressure parts

4.1 Flat products, tubes and forgings

The material shall be ordered and delivered in accordance with relevant harmonized European Standards given in Table 3.2-1, EMDS or PMA. The additional requirements given in this standard shall be taken into account.

Cylindrical sections (outer shells, furnace tubes, etc.) shall be manufactured from plate or seamless or fusion welded tube. Plates cut from coil or strip shall be permitted, provided that all the requirements for plates in this part are complied with. The welded joint in fusion welded tubes shall be a full penetration weld as detailed in 5.5 of EN 12953-5:2002 and shall be examined.

4.2 Valves and fittings

The materials for valves and fittings shall be suitable for their design and operating conditions.

Materials given in Table 4.2-1 shall be permitted for valves up to, and including DN 200 where the operating pressure and temperature does not exceed 13 bar gauge and 220 °C respectively.

Table 4.2-1 — Grades of cast iron

Material	Standard	Grades
Grey (lamellar)	EN 1561	EN-GJL-200 and 250
Spheroidal graphite	EN 1563	EN-GJS-350 and 400

However, the use of grey cast iron shall not be permitted for main stop valves on steam boilers, and in other cases where shock loads can be expected.

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4.3 Welding consumables

The welding consumables (electrodes, filler wires, filler rods, fluxes, or powder) shall be selected so that the mechanical properties and corrosion resistance of the weld metal are compatible with the base materials.

The welding consumables shall be ordered and delivered in accordance with EN 12074 and prEN 13479-1

NOTE The supplementary methods and evaluation of welding consumables will be specified in Work Item 00121250 of CEN/TC 121 [2].

4.4 Acceptance tests

4.4.1 General

Acceptance tests shall be carried out in accordance with the general rules given in the appropriate European Standard for the material.

4.4.2 Plates

The number, selection and preparation of samples and test pieces shall be in accordance with EN 10028-1.

4.4.3 Tubes

The number, selection and preparation of samples and test pieces shall be in accordance with the product standards given in Table 3.2-1.

Additionally, when tubes are to be expanded or swaged, a drift expansion test to EN 10234 or flanging test to EN 10235 shall be carried out.

NOTE Impact tests on smoke tubes are not required.