SIST

SLOVENSKI STANDARD
SIST EN 303-4:1999

01-december-1999

Kotli za gretje - 4. del: Kotli z ventilatorskimi gorilniki ï Posebne zahteve za kotle z razprġevalnimi oljnimi ventilatorskimi gorilniki z moļ jo do 70 kW in najviġjim delovnim tlakom 3 bare - Terminologija, posebne zahteve, preskuġanje in oznaļ evanje

Heating boilers - Part 4: Heating boilers with forced draught burners - Special requirements for boilers with forced draught oil burners with outputs up to 70 kW and a maximum operating pressure of 3 bar - Terminology, special requirements, testing and marking

Heizkessel - Teil 4: Heizkessel mit Gebläsebrenner - Spezielle Anforderungen an Heizkessel mit Ölgebläsebrennern mit einer Leistung bis 70 kW und einem maximalen Betriebsdruck von 3 bar - Begriffe, besondere Anforderungen, Prüfung und Kennzeichnung

Chaudieres de chauffage - Partie 4: Chaudieres avec bruleurs a air soufflé - Exigences spécifiques pour chaudieres avec bruleurs fioul a air soufflé avec une puissance utile jusqu'a 70 kW et une pression de service maximale de 3 bar - Terminologie, prescriptions spéciales, essais et marquage

Ta slovenski standard je istoveten z: EN 303-4:1999

ICS:

01.040.91	Gradbeni materiali in gradnja (Slovarji)	Construction materials and building (Vocabularies)
91.140.10	Sistemi centralnega ogrevanja	Central heating systems

SIST EN 303-4:1999 **en**

EUROPEAN STANDARD
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EN 303-4

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ICS 01.040.91; 91.140.10

Descriptors: central heating, boilers, definitions, specifications, equipment specification, materials, steels, cast iron, copper, production control, chemical composition, mechanical properties, welded joints, welding, dimensions, performance evaluation, tests, marking, technical notices

English version

Heating boilers - Part 4: Heating boilers with forced draught burners - Special requirements for boilers with forced draught oil burners with outputs up to 70 kW and a maximum operating pressure of 3 bar - Terminology, special requirements, testing and marking

Chaudières de chauffage - Partie 4: Chaudières avec brûleurs à air soufflé - Exigences spécifiques pour chaudières avec brûleurs fioul à air soufflé avec une puissance utile jusqu'à 70 kW et une pression de service maximale de 3 bar - Terminologie, prescriptions spéciales, essais et marquage

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This European Standard was approved by CEN on 6 June 1998.

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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 Central Secretariat has the same status as the official versions.

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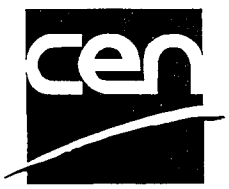


EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Contents

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 57 "Central heating 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 July 1999, and conflicting national standards shall be withdrawn at the latest by July 1999.

The following structure is intended for the standards for heating boilers:

prEN 303–1
Heating boilers – Part 1: Heating boilers with forced draught burners – Terminology, general requirements, testing and marking

prEN 303–2
Heating boilers – Part 2: Heating boilers with forced draught burners – Special requirements for boilers with atomizing oil burners

prEN 303–3
Heating boilers – Part 3: Gas fired central heating boilers – Assembly comprising a boiler body and a forced draught burner

prEN 303–4
Heating boilers – Part 4: Heating boilers with forced draught burners – Special requirements for boilers with forced draught oil burners with outputs up to 70 kW and a maximum operating pressure of 3 bar – Terminology, special requirements, testing and marking

prEN 303–5
Heating boilers – Part 5: Heating boilers for solid fuels, hand and automatically fired, with a nominal heat output of up to 300 kW – Terminology, requirements, testing and marking

EN 304
Heating boilers – test code for heating boilers for atomizing oil burners

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, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This standard is applicable to heating boilers with forced draught oil burners up to a nominal heat output of 70 kW. They are operated, either with negative pressure (natural draught boiler) or with positive pressure (pressurised boiler) in the combustion chamber, in accordance with the boiler manufacturer's instructions.

This standard specifies the necessary terminology, the requirements on the materials and testing of them, and marking requirements for heating boilers.

The boilers are suitable for open vented systems up to a maximum allowable pressure of 1 bar (class 1 pressure) and open and closed water systems up to a maximum allowable pressure of 3 bar (class 2 pressure).

The boilers are capable of operating with either conventional flues or low level discharge flues as specified by the boiler manufacturer.

The boilers are provided as matched units with factory fitted burners for burning kerosene or gas oil. When using a low level flue gas discharge only kerosene may be used (see annex B).

The requirements of this standard apply to heating boilers which are tested on an authorised test rig in accordance with EN 304 and annex B of this standard.

Boilers in accordance with this standard are designed for the heating of central heating installations in which the heat carrier is water, and the temperature of which is restricted to 95 °C at normal operating conditions. For boilers with a built-in or attached water heater (storage or continuous flow heater) this standard only applies to the parts of the water heater which are necessarily subject to the operating conditions of the heating boiler (heating part).

This standard does not apply to gas boilers with atmospheric burners, boilers for solid fuels, oil or gas fired condensation boilers, boilers with oil vaporisation burners and low temperature boilers. For these boilers there are further requirements.

NOTE: Low temperature boilers are those operating with a (water) variable temperature up to 40 °C or less, or those which cannot be set at a temperature higher than 55 °C.

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.

EN 226
Atomizing oil burners – connecting dimensions between burners and heat generators

EN 287–1
Approval testing of welders – fusion welding – Part 1: steels

EN 287–2
Approval testing of welders – fusion welding – Part 2: aluminium and aluminium alloys

EN 303–2
Heating boilers – Part 2: Heating boilers with forced draught burner – Special requirements for boilers with atomizing oil burners

EN 304 : 1992
Heating boilers – test code for heating boilers for atomizing oil burners

EN 304 : 1992/prA1
Heating boilers – Test code for heating boilers for atomizing oil burners (Amendment 1)

EN 10003–1
Metallic materials – Brinell hardness test – Part 1: Test method

EN 10021
General technical delivery requirements for steel and iron products

EN 10025
Hot rolled products of non-alloy structural steels - technical delivery conditions (includes amendment A1 : 1993)

EN 10027–2
Designation systems for steels - Part 2: Numerical system

EN 10028–2
Flat products made of steels for pressure purposes; part 2: non-alloy and alloy steels with specified elevated temperature properties

EN 10029
Hot-rolled steel plates 3 mm thick or above - tolerances on dimensions, shape and mass

EN 10088–2
Stainless steels – Part 2: Technical delivery conditions for sheet/plate and strip for general purposes

EN 10120
Steel sheet and strip for welded gas cylinders

EN 24063
Welding, brazing, soldering and braze welding of metals - nomenclature of processes and reference numbers for symbolic representation on drawings (ISO 4063 : 1990)

EN 60335–1
Safety of household and similar electrical appliances – Part 1: General requirements (IEC 335–1 : 1991, modified)

EN 60529
Degrees of protection provided by enclosures (IP-Code) (IEC 529:1989)

EN 60730–2–9
Automatic electrical controls for household and similar use – Part 2: Particular requirements for temperature sensing controls (IEC 730–2–9: 1992, modified)

ISO 7–1
Pipe threads where pressure-tight joints are made on the threads – Part 1: Dimensions, tolerances and designation

ISO 7–2
Pipe threads where pressure-tight joints are made on the threads – Part 2: Verification by means of limit gauges

ISO 185
Grey cast iron - classification

ISO 228/1
Pipe threads where pressure-tight joints are not made on the threads – Part 1: Dimensions, tolerances and designation

ISO 228/2
Pipe threads where pressure-tight joints are not made on the threads – Part 2: Verification by means of limit gauges

ISO 857
Welding, brazing and soldering processes - vocabulary

ISO 2553
Welded, brazed and soldered joints - symbolic representation on drawings

ISO 7005–1
Metallic flanges - Part 1: Steel flanges

ISO 7005–2
Metallic flanges - Part 2: cast iron flanges

ISO 7005–3
Metallic flanges - Part 3: copper alloy and composite flanges

3 Definitions

For the purposes of this standard, the following definitions apply.

3.1 operating pressure: the maximum allowable pressure at which the boiler is to be normally operated. The operating pressure is less than the test pressure and the type test pressure [prEN 303–1].

3.2 test pressure: pressure to which all boilers and their parts are subjected during production in the works of the manufacturer or during setting up by the installer [prEN 303–1].

3.3 type test pressure: pressure to which the pre-production heating boiler(s) and associated parts are subjected before start of mass production in the manufacturing works [prEN 303–1].

3.4 operating temperature: the maximum allowable temperature at which the boiler can be operated under normal operating conditions at the maximum setting of the boiler's water temperature controller [prEN 303–1].

3.5 heat output Q, heat output range: is the amount of heat transferred to the heat carrier (water) per unit of time [prEN 303–1].

The heat output range is the span of output below the nominal heat output specified by the manufacturer over which the boiler meets the requirements of this standard and over which it can be used [prEN 303–1].

3.6 nominal heat output Q_N: is the continuous output specified by the manufacturer in accordance with the requirements of this standard. It is the maximum useful quantity of heat transferred to the heat carrier per hour [prEN 303–1].

3.7 heat input Q_B: is the amount of heat in unit time which is supplied to the furnace of the heating boiler by the fuel based on its net calorific value H_i [prEN 303–1].

3.8 boiler efficiency η_K: is the ratio of the heat output (Q) to the heat input (Q_B) supplied by the fuel [prEN 303–1].

$$\eta_K = \frac{Q}{Q_B}$$

3.9 Draught: Is the pressure differential between the static air pressure in the place of installation and the static pressure of the exhaust gases, as measured in the exhaust gas measuring section, which is required for correct operation of the boiler at nominal output [prEN 303–1].

3.10 gas side resistance: is the pressure differential between the combustion chamber and the boiler exit [prEN 303–1].

3.11 soundness of combustion system: is the soundness of the combustion circuit through which the exhaust gases flow [prEN 303–1].

3.12 exit flue temperature t_A: is the temperature measured at the flue exit of the boiler [prEN 303–1].

3.13 flue gas loss: is the quantity of heat per unit time which leaves the flue gas exit of the boiler unused [prEN 303–1].

3.14 combustion circuit: comprises the combustion chamber, the heat exchanger, the air supply circuit and the combustion product circuit up to the flue exit [prEN 303–1].

3.15 standby loss q_B: is the quantity of heat which is necessary to maintain the boiler at a given temperature when no heat output is used. It is stated as q_B in relation to the heat input Q_B [prEN 303–1].

3.16 water side resistance: is the pressure loss across the boiler measured at the flow and return connections of the boiler, with a volume flow corresponding to the nominal heat output [prEN 303–1].

3.17 control thermostat: a device enabling the water temperature to be kept automatically, within a given range, at a predetermined value [prEN 303–1].

3.18 safety temperature limiter: a device that causes safety shutdown and non-volatile lockout so as to prevent the water temperature exceeding a preset limit [prEN 303–1].

3.19 overheat cut-off device: a device that causes shutdown and non-volatile lockout before the boiler is damaged and/or before safety is put in question.

3.20 room sealed boilers: a boiler in which the combustion circuit is substantially sealed with respect to the room in which the appliance is installed.

4 Requirements

4.1 Construction requirements

4.1.1 General requirements

Boilers shall be fire-resistant and safe to operate. They shall be made of non-combustible materials and shall be resistant to deformation and shall be such that

- they can withstand the stresses arising during normal operation;
- the burner and the boiler cannot become heated to create a hazard;
- dangerous accumulations of combustible gases (fuel mixed with air) in the combustion chamber and in the flues are prevented;
- gases cannot leak from the boiler in dangerous quantities.

Combustible materials are allowable for

- components of accessories e. g. burner covers, if the parts are fitted outside of the boiler;
- internal components of controls and safety equipment;
- operating handles;
- electrical equipment;
- thermal insulation (see 4.1.5.8); only asbestos-free materials are allowable.

Component parts of covers, operating, control and safety devices and electrical accessories shall be arranged in such a way that their surface temperatures, under steady state conditions, do not exceed those specified either by the manufacturer or in the component part standard.

The materials for the parts subject to pressure shall be in accordance with the material specifications in this standard. They shall be suitable for the purpose and treatment intended. The mechanical and physical properties as well as the chemical composition of the materials shall be guaranteed.

4.1.2 Production documentation

4.1.2.1 Drawings

The following shall be specified in the boiler drawings or in the relevant documents:

- the specified materials;
- the welding process, the joint type (generally the symbol for the joint type is sufficient) and the welding fillers;
- the maximum allowable operating temperature in °C;
- the maximum allowable operating pressure in bar;
- the test pressure in bar;
- the nominal heat output or the heat output range for every boiler size in kW.

4.1.2.2 Manufacturing controls

Manufacturing control shall be carried out.

4.1.3 Heating boilers of steel and of non-ferrous materials

4.1.3.1 Execution of welding work

Boiler manufacturers who carry out welding work shall meet the requirements of EN 287–1 and EN 287–2:

- only welders who are qualified in the welding of the materials to be processed may be used;
- equipment shall be available to allow defect free welding to be carried out;
- supervision of the welding shall be carried out by staff qualified in welding (at least one supervisor shall be so qualified).

4.1.3.2 Welded joints and welding fillers

The materials shall be suitable for welding. The materials in accordance with table 1 are suitable for welding and do not require additional heat treatment after welding.

The welded joints shall not show any cracks or bonding faults and shall be defect free over the whole cross-section for butt welds. One-sided fillet welds, and half Y-welds which have been welded through, shall be kept substantially free from bending stresses. Smoke tubes, inserted stays and similar components need not be counterwelded. Double fillet welds are only permissible when sufficiently cooled. Projections into the flue gas side in areas of high thermal stresses shall be avoided.

Corner welds, edge welds and similar welded connections which are subjected to high bending stresses during production and operation are to be avoided.

For welded longitudinal stay bars or stay tubes the shearing cross section of the fillet weld should be at least 1,25 times the required stay bar or stay tube cross sectional area.

See table 2 (dimensions in mm) for details on the welded joints mentioned. Welding fillers shall be suitable for the material being used.

The terms used in table 2 are in accordance with ISO 2553. The reference numbers of welding processes are in accordance with ISO 857 and EN 24063.

4.1.3.3 Parts of steel subject to pressure

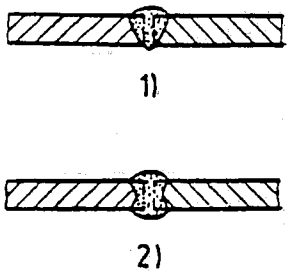
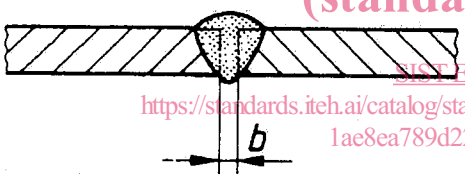
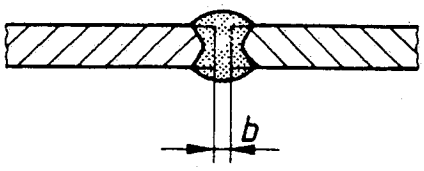
The steels listed in table 1 shall be used.

The specification of the materials shall be documented by a works certificate (see EN 10021). These certificates shall be obtained by the boiler manufacturer. This does not apply to small components, e. g. sockets up to DN 50, screws and nuts.

Table 1: Materials

References	Material type	Material numbers in accordance with EN 10027-2
EN 10025	S235JR	1.0037
	S235JRG2	1.0038
	S235J0	1.0114
	S235J2G3	1.0116
	S275JR	1.0044
	S275J0	1.0143
	S275J2G3	1.0144
	S355JR	1.0045
	S355J0	1.0553
	S355J2G3	1.0570
	S355K2G3	1.0595
EN 10028-2		
	P235GH	1.0345
	P265GH	1.0425
	P295GH	1.0481
	P355GH	1.0473
	16Mo3	1.5415
	13CrMo4-5	1.7335
	10CrMo9-10	1.7380
	11CrMo9-10	1.7383
EN 10120		
	P245NB	1.0111
	P265NB	1.0423
	P310NB	1.0437
	P355NB	1.0557
EN 10088-2		
	X5CrNi18-10	1.4301
	X6CrNi17-12-2	1.4401
	X6CrNiTi18-10	1.4541
	X6CrNiNb18-10	1.4550
	X6CrNiMoTi17-12-2	1.4571
	X6CrNiMoNb17-12-2	1.4580
	X3CrNiMo17-3-3	1.4436

Table 2: Weld joints and welding processes

No.	Term	Material thick-ness t in mm	Welding process	Remarks
1.1	Square butt weld  1) one side 2) both sides	≤ 6 (8)	135 12 131 (111)	Permissible up to t = 8 mm on use of deep penetration elec-trodes or welding on both sides
1.2	Square butt weld  	≥ 6 up to 12	12	Root gap 2 mm to 4 mm with stiffener, powder holder necessary
1.3	Square butt weld (double)  	> 8 up to 12	135 12 (111)	Root gap 2 mm to 4 mm Deep penetration electrodes must be used for manual electro welding

(continued)