
Kotli za ogrevanje - Kotli z ventilatorskimi gorilniki - 1. del: Terminologija, splošne zahteve, preskušanje in označevanje

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

Heizkessel - Heizkessel mit Gebläsebrenner - Teil 1: Begriffe, allgemeine Anforderungen, Prüfung und Kennzeichnung

Chaudières de chauffage - Chaudières avec brûleurs à air soufflé - Partie 1: Terminologie, spécifications générales, essais et marquage

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English version

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REPUBLIKA SLOVENIJA
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LJUBLJANA
SIST. EN 303-1
PREVZET PO METODI RAZGLASITVE

-03- 1997

This European Standard was approved by CEN on 1992-09-18. 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 Central Secretariat or to any CEN member.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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FOREWORD

This European Standard was drawn up by the Technical Committee CEN/TC 57 "Central heating boilers" of which the secretariat is held by DIN.

The following structure is intended for the Standards for heating boilers prepared by CEN/TC 57 :

- * EN 303-1 : Heating boilers - Heating boilers with forced draught burners - Part 1: Terminology, general requirements, testing and marking
- * EN 303-2 : Heating boilers - Heating boilers with forced draught burners - Part 2: Special requirements for boilers with atomizing oil burners
- * : Heating boilers - Heating boilers with forced draught burners up to a heat output of 70 kW and an operating pressure of max. 3 bar - Terminology, special requirements, testing and marking (standard in preparation)
- * EN 304 : Heating boilers - Test code for heating boilers for atomizing oil burners

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This European Standard shall be given the status of national standard, either by publication of an identical text or by endorsement, at the latest by March 1993, and conflicting national standards shall be withdrawn at the latest by March 1993.

The Standard was approved and in accordance with the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard : Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.



1 Scope

1.1 This standard applies to heating boilers with burners using fans up to a nominal heat output of 300 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 manufacturers' instructions.

Particular requirements for boilers which can only be used with open vents are contained in a separate document (being prepared).

The requirements of this standard apply to heating boilers which are tested on an authorised test rig.

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 100 °C at a maximum pressure of 6 bar. 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 vapourisation 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.

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1.2 The purpose of this standard is to lay down the necessary terminology, the requirements on the materials and testing of them, and marking requirements.

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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.

EN 226:	1987	Atomizing oil burners; connecting dimensions between burners and heat generators
EN 267:	1991	Atomizing oil burners of monobloc type; testing
prEN 287-1:	1988	Approval testing of welders; fusion welding; part 1: steel
prEN 287-2:	1988	Approval testing of welders; fusion welding; part 2: aluminium and aluminium alloys
EN 304:	1992	Heating boilers; test code for heating boilers for atomizing oil burners

EN 60335-1: 88	Safety of household and similar electrical appliances; Part 1: General requirements
CENELEC HD 251 S3	CENELEC Harmonization Document Safety of household and similar electrical appliances; Part 1: General requirements
CENELEC HD 365 S3	CENELEC Harmonization Document Classification of degrees of protection provided by enclosures
EURONORM 3 - 79	Brinell hardness measurement for steel
EURONORM 21 - 78	General technical terms of delivery for steel and steel products
EURONORM 29 - 81	Hot-rolled steel plates 3 mm thick or above; Tolerances on dimensions, shape and mass
ISO 7-1: 1982	Pipe threads where pressure-tight joints are made on the threads - Part 1: Designation, dimensions and tolerances
ISO 7-2: 1982	Pipe threads where pressure-tight joints are made on the threads - Part 2: Verification by means of limit gauges
ISO 185: 1988	Grey cast iron - Classification
ISO 228/1: 1982	Pipe threads where pressure-tight joints are not made on the threads - Part 1: Designation, dimensions and tolerances
ISO 228/2: 1987	Pipe threads where pressure-tight joints are not made on the threads - Part 2: Verification by means of limit gauges
ISO 857: 1990	Welding, brazing and soldering processes; vocabulary
ISO 2553: 1984	Welds - symbolic representation on drawings
prEN 24063: 1991	Welding, brazing, soldering and braze welding of metals; nomenclature of processes and reference numbers for symbolic representation on drawings

3 Terminology

3.1 Operating pressure

The operating pressure is that pressure at which the boiler can be operated safely. The operating pressure is less than the test pressure and the type test pressure.

3.2 Test pressure

The test pressure is that 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.

3.3 Type test pressure

The design pressure is that pressure to which the heating boilers and their parts are first subjected before start of mass production in the manufacturing works.

3.4 Operating temperature

The operating temperature is that temperature at which the boiler can be operated under normal operating conditions at the maximum setting of the boiler's water temperature controller.

3.5 Heat output Q , heat output range

The heat output Q is the amount of heat transferred to the heat carrier (water) per unit of time.

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.

3.6 Nominal heat output Q_N

The nominal heating output 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.

3.7 Heat input Q_B

The heat input 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_u .

3.8 Boiler efficiency η_k

The boiler efficiency is the ratio of the heat output (Q) to the heat input (Q_B) supplied by the fuel.

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

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3.9 Draught

The draught requirement 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.

3.10 Gas side resistance

The gas side resistance of the boiler is the pressure differential between the combustion chamber and the boiler exit when operating at nominal output.

3.11 Soundness of combustion system

The soundness of the combustion system of the boiler is the soundness of the combustion chamber, the flues and the boiler parts through which the exhaust gases flow.

3.12 Exit flue temperature

The exit flue gas temperature t_A is the temperature measured at the exit of the boiler (exhaust stack).

3.13 Flue gas loss

The flue gas loss is that quantity of heat per unit time which leaves the flue gas exit of the boiler unused.

3.14 Gas volume

The gas volume is the volume of the combustion chamber and the flueways up to the boiler outlet.

3.15 Standby loss

Standby loss is that 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 .

3.16 Water side resistance

Water side resistance means 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.

3.17 Temperature control equipment

The temperature control equipment here in after called the temperature controller, measures the temperature at the central point, compares it with the previously set nominal value, and influences the actual temperature in relation to the nominal value.

3.18 Safety temperature limiter

An automatic operating device which, when the highest limiting temperature of the water is reached, causes shutdown and lock out of the fuel supply. The fuel supply can only be restored when the water temperature has fallen below the limit value and after resetting manually or with the use of a tool. The safety temperature limiter satisfies the requirements for further safety and differs from the high limit thermostat by having additional safety of the sensor.

4 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 atomising oil burner and the heat carrier (water) cannot become heated to a dangerous extent.
- dangerous accumulations of combustible gases (fuels mixed with air) in the combustion chamber and in the flues are prevented and that
- gases cannot leak from the boiler in dangerous quantities.

Combustion 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 clause 4.1.5.10)

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

4.1 Construction requirements

4.1.1 General requirements

The materials for the parts subject to pressure shall be in accordance with generally accepted technical requirements. 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 certificated by the relevant material producer.

4.1.2 Production documentation

4.1.2.1 Drawings

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

- the specified materials,
- the welding process, the seam type - generally the symbol for the seam type is sufficient - and the welding fillers,
- the permissible operating temperature in °C,
- the permissible 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 prEN 287 part 1 and part 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).

Table 1. Mechanical properties and chemical compositions of carbon and stainless steels

Materials	Mechanical Properties				Chemical Compositions										
	Tensile strength Rm N/mm ²	Yield point Rp0,2 N/mm ²	Breaking elongation EL at Lo A5 = 5 · d0 %	Breaking elongation EL at Lo A5 = 5 · d0 %	C	P	S	Si	Mn	Cr	Mo	Ni	Ti	Nb/Ta	
Pipes, Sheets	≤ 520	≤ 0,7 ¹⁾	≤ 20	-	≤ 0,25	≤ 0,05 ≤ 0,06	≤ 0,05	-	-	-	-	-	-	-	
ferritic	≤ 600	≥ 250	≥ 20	≤ 15	≤ 0,08	≤ 0,045	≤ 0,030	≤ 1,0	≤ 1,0	15,5- 18	≤ 1,5	-	≤ 7 x % C	≤ 12 x % C	
austenitic	≤ 800	≥ 180	≥ 35	≤ 30	≤ 0,08	≤ 0,045	≤ 0,030	≤ 1,0	≤ 2,0	16,5- 20	2,0- 3,0	9- 15	≤ 5 x % C	≤ 8 x % C	

¹⁾ Ratio yield point - tensile strength

An adequate high temperature yield point for the highest possible temperature of the components must be guaranteed

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4.1.3.2 Welding seams 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 seams 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 in longitudinal stay bars or stay tubes the shearing cross section of the fillet weld should be 1.25 times the required stay bar or stay tube cross sectional area.

See Table 2 (dimensions in mm) for details on the welding seams mentioned. Welding fillers shall be suitable for the material being used.

The terms are given in table 2, they are in accordance with ISO 2553; the reference numbers of welding processes are respectively in accordance with ISO 857 and prEN 24063.

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4.1.3.3 Parts of steel subject to pressure

For steel materials the mechanical properties and chemical composition which correspond to the values listed in Table 1 may be used for the manufacture of boilers. The steels listed in Appendix A with the appropriate designation in accordance with EUROSTANDARD or national standards correspond to the materials listed in Table 1.

The qualitative properties of the materials shall be documented by a works certificate (EURONORM 21-78). These certificates must be submitted to the boiler manufacturers. This does not apply to components, e.g. sleeves up to DN 50, screws and nuts.