SLOVENSKI STANDARD
SIST EN 303-5:2012

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Nadomešča:
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Kotli za gretje - 5. del: Kotli na trdna goriva z ročnim in samodejnim polnjenjem z imensko močjo do 500 kW - Terminologija, zahteve, preskušanje in označevanje

Heating boilers - Part 5: Heating boilers for solid fuels, manually and automatically stoked, nominal heat output of up to 500 kW - Terminology, requirements, testing and marking

Heizkessel - Teil 5: Heizkessel für feste Brennstoffe, manuell und automatisch beschickte Feuerungen, Nenn-Wärmeleistung bis 500 kW - Begriffe, Anforderungen, Prüfungen und Kennzeichnung

Chaudières de chauffage - Partie 5: Chaudières spéciales pour combustibles solides, à chargement manuel et automatique, puissance utile inférieure ou égale à 500 kW - Définitions, exigences, essais et marquage

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Heating boilers - Part 5: Heating boilers for solid fuels, manually and automatically stoked, nominal heat output of up to 500 kW - Terminology, requirements, testing and marking

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This European Standard was approved by CEN on 10 May 2012.

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Contents

Page

Foreword 5

Introduction 7

1 Scope 8
1.1 General 8
1.2 Fuels 8
1.2.1 Biogenic fuels 9
1.2.2 Fossil fuels 9
1.2.3 Other solid fuels 9

2 Normative references 9

3 Terms and definitions 12

4 Requirements 17
4.1 General requirements 17
4.2 Construction requirements 18
4.2.1 Production documentation 18
4.2.2 Heating boilers made of steel and non-ferrous materials 19
4.2.3 Boilers made of cast materials 24
4.2.4 Design requirements 25
4.3 Safety requirements 28
4.3.1 General 28
4.3.2 Manual stoking 28
4.3.3 Safety against back burning for automatic stoked boilers 28
4.3.4 Safety against fuel overload of the boiler or interruption in fuel supply 32
4.3.5 Safety against lack of air supply or insufficient combustion 32
4.3.6 Surface temperatures 32
4.3.7 Leakage of the combustion system 32
4.3.8 Temperature control and limiting devices 33
4.3.9 Heating boiler accessories 34
4.4 Performance requirements 35
4.4.1 General 35
4.4.2 Boiler efficiency 35
4.4.3 Flue gas temperature 36
4.4.4 Draught 36
4.4.5 Combustion period 36
4.4.6 Minimum heat output 36
4.4.7 Emission limits 37

5 Test 38
5.1 Test conditions 38
5.1.1 General 38
5.1.2 Choice of boiler and fittings to be tested 39
5.1.3 Condition of the boiler 39
5.1.4 Type test 39
5.2 Measuring instruments and methods 39
5.3 Test fuel 40
5.4 Pressure test for boilers of sheet or sheet metal of non-ferrous metal 42
5.4.1 Tests to be carried out before production 42
5.4.2 Test during production 42
5.5 Pressure test for boilers of cast iron or non-ferrous metals 42
5.5.1 Test to be carried out before production 42
5.5.2 Test during production 43

5.6 Test for gas side soundness 44
5.7 Conducting the boiler performance test 44
5.7.1 General 44
5.7.2 Setting up the test rig 45
5.7.3 Measured quantities 45
5.7.4 Test method and test duration 46
5.8 Determination of the heat output and the efficiency of the boiler 47
5.8.1 Method for the measurement of the heat output 47
5.8.2 Determining the nominal heat output 47
5.8.3 Determining the minimum heat output 47
5.8.4 Determination of the boiler efficiency (direct method) 48
5.8.5 Electrical consumption 48
5.9 Determination of the emission values 48
5.9.1 Heating boiler with manual stoking 48
5.9.2 Heating boiler with automatic stoking 48
5.9.3 Determination of the emissions at minimum heat output 48
5.10 Calculation 49
5.10.1 Boiler heat output 49
5.10.2 The heat input 49
5.10.3 Boiler efficiency 49
5.10.4 Emissions 49
5.11 Determination of the waterside resistance 50
5.12 Surface temperature 50
5.13 Function check of the temperature controller and safety temperature limiter at the boiler 50
5.14 Function test for the rapidly disconnect able firing system 51
5.15 Function test on the device for dissipating excess heat (partly or non disconnectable firing system) 51
5.16 Check of the safety and risk assessment 51
5.16.1 General 51
5.16.2 Safety test of consequences of fuel overload and effect of a blockage of the fuel supply 53
5.16.3 Loss of combustion air supply 53
5.16.4 Resistance to thermal conductance 53
5.16.5 Additional tests for alternative verification of the safety against back burning 53

6 Test report and other documents 54

7 Marking 55
7.1 General 55
7.2 Information on the boiler plate 55
7.3 Boiler plate requirements 55

8 Technical documentation, supplied with boiler 55
8.1 General 55
8.2 Technical information and installation instructions 55
8.3 Operating instructions 57

Annex A (informative) Manual measurement of particles in the gas flow, gravimetric determination of particle load with filter systems 58

Annex B (normative) Design criteria for solutions to prevent back burning 61

Annex C (informative) A-deviations 66
C.1 General 66
C.2 Deviations from Austria: 66
C.2.1 General 66
C.2.2 Boiler efficiency for nominal heat output and minimum heat output 66
C.2.3 Emission limits 67
C.3 Deviations from CROATIA 68
C.4 Deviations from DENMARK 69
C.4.1 Subclause 4.4.2 Boiler Efficiency 69
C.4.2 Subclause 4.4.7 Emission Limits 69
C.4.3 Subclause 5.1 Test Base 70

C.5 Deviations from Germany **70**
C.5.1 Clause 4.4.7 Emission limits **70**
C.5.2 Clause 5.9 ..... **72**
C.6 Deviations from Switzerland **72**
C.7 Deviations from United Kingdom **73**
C.8 Deviations for Italy **77**

Annex ZA (informative) **Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC Machinery Directive** **79**

Bibliography **81**

Foreword

This document (EN 303-5:2012) has been prepared by Technical Committee /TC 57 “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 December 2012, and conflicting national standards shall be withdrawn at the latest by December 2012.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 303-5:1999.

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 EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

In comparison with EN 303-5:1999, the following technical changes were made:

a) the scope was extended to a nominal heat output of the heating boilers for ≤ 500 kW;

b) usable fuel to non-wood biomass and further solid fuels were extended;

c) requirements for materials, weld joints and wall thicknesses were revised;

d) risk analysis was implemented;

e) general and electrical safety requirements were revised;

f) emission class 1 and 2 were deleted and new emission class 4 and 5 were added;

g) tests were revised and new tests for safety requirements were added;

h) Annexes were re-structured;

i) Consideration was given to the essential requirements of the Machinery Directive 2006/42/EC.

The following structure is intended for the European Standards for heating boilers:

— EN 303-1, *Heating boilers — Part 1: Heating boilers with forced draught burners — Terminology, general requirements, testing and marking*

— EN 303-2, *Heating boilers — Part 2: Heating boilers with forced draught burners — Special requirements for boilers with atomizing oil burners*

— EN 303-3, *Heating boilers — Part 3: Gas-fired central heating boilers — Assembly comprising a boiler body and a forced draught burner*

— EN 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*

— EN 303-5, *Heating boilers — Part 5: Heating boilers for solid fuels, manually and automatically stoked, nominal heat output of up to 500 kW — Terminology, requirements, testing and marking*

— EN 303-6, *Heating boilers — Part 6: Heating boilers with forced draught burners — Specific requirements for the domestic hot water operation of combination boilers with atomizing oil burners of nominal heat input not exceeding 70 kW*

— EN 303-7, *Heating boilers — Part 7: Gas-fired central heating boilers equipped with a forced draught burner of nominal heat output not exceeding 1 000 kW*

— EN 304, *Heating boilers — Test code for heating boilers for atomizing oil burners.*

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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This document is a type C standard as stated in EN ISO 12100.

The machinery concerned, and the extent to which hazards, hazardous situations and hazardous events are covered, are indicated in the scope of this document.

This standard deals with boilers which are within the Scope Machinery Directive and boilers that are outside of the Scope Machinery Directive.

When provisions of this type C standard are different from those which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of the other standards, for machines that have been designed and built according to the provisions of this type C standard.

1 Scope

1.1 General

This European Standard applies to heating boilers including safety devices up to a nominal heat output of 500 kW which are designed for the burning of solid fuels only and are operated according to the instructions of the boiler manufacturer.

This European Standard deals with significant hazards, hazardous situations and events relevant to heating boilers used as intended and under the conditions foreseen by the manufacturer (see Clause 4).

The boilers may operate under natural draught or forced draught. The stoking may work manually or automatically.

NOTE This European Standard deals with boilers which are both within and outside of the scope of the Machinery Directive 2006/42/EC.

This European Standard contains requirements and test methods for safety, combustion quality, operating characteristics, marking and maintenance of heating boilers. It also covers all external equipment that influences the safety systems (e.g. back burning safety device, integral fuel hopper).

This European Standard covers only boilers that include burners as a unit. The standard applies to the combination of a boiler body with a solid fuel burner according to EN 15270 as a unit only when the whole unit is tested in accordance with this European Standard.

Heating boilers in accordance with this European Standard are designed for central heating installations where the heat carrier is water and the maximum allowable temperature is 110 °C, and which can operate at a maximum allowable operating pressure of 6 bars. For heating boilers with a built-in or attached water heater (storage or continuous flow heater), this European Standard only applies to those parts of the water heater which are necessarily subject to the operating conditions of the heating boiler (heating part).

This European Standard does not apply to:

— heating boilers and other heating appliances which are also designed for the direct heating of the place of installation;

— cooking appliances;

— the design and construction of external fuel storage and transportation devices prior to the safety devices of the boiler;

— room sealed applications;

— condensing boilers.

This European Standard specifies the necessary terminology for solid fuel heating boilers, the control and safety related requirements, the design requirements, the technical heating requirements (taking into account the environmental requirements) and testing, as well as the marking requirements.

This European Standard is not applicable to heating boilers which are tested before the date of its publication as an EN (European Standard).

1.2 Fuels

These boilers may burn either fossil fuels, biogenic fuels or other fuels such as peat, as specified for their use by the boiler manufacturer, in accordance with the requirements of this European Standard.

Solid fuels included in this European Standard are categorised as follows.

1.2.1 Biogenic fuels

Biomass in a natural state, in the form of:

— **A** log wood with moisture content w ≤ 25 %, according to EN 14961-5;

— **B1** chipped wood (wood chipped by machine, usually up to a maximum length of 15 cm) with moisture content from w 15 % to w 35 %, according to EN 14961-4;

— **B2** chipped wood as under B1, except with moisture content w > 35 %;

— **C1** compressed wood (e.g. pellets without additives, made of wood and/or bark particles; natural binding agents such as molasses, vegetable paraffins and starch are permitted), pellets according to EN 14961-2;

— **C2** compressed wood (e.g. briquettes without additives, made of wood and/or bark particles; natural binding agents such as molasses, vegetable paraffins and starch are permitted), briquettes according to EN 14961-3;

— **D** sawdust with moisture content w ≤ 50 %;

— **E** non-woody biomass, such as straw, miscanthus, reeds, kernels and grains according to EN 14961-6.

1.2.2 Fossil fuels

— **a** bituminous coal;

— **b** brown coal;

— **c** coke;

— **d** anthracite.

1.2.3 Other solid fuels

— **e** such as peat or processed fuels, according to EN 14961-1.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 287-1, *Qualification test of welders — Fusion welding — Part 1: Steels*

EN 303-1:1999+A1:2003, *Heating boilers — Part 1: Heating boilers with forced draught burners — Terminology, general requirements, testing and marking*

EN 304:1992+A1:1998+A2:2003, *Heating boilers — Test code for heating boilers for atomizing oil burners*

EN 1561, *Founding — Grey cast irons*

EN 1563, *Founding — Spheroidal graphite cast irons*

EN 10025-1, *Hot rolled products of structural steels — Part 1: General technical delivery conditions*

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

EN 10029, *Hot rolled steel plates 3 mm thick or above — Tolerances on dimensions and shape*

EN 10088-2, *Stainless steels — Part 2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes*

EN 10120, *Steel sheet and strip for welded gas cylinders*

EN 10204, *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 10222-2, *Steel forgings for pressure purposes — Part 2: Ferritic and martensitic steels with specified elevated temperature properties*

EN 10226-1, *Pipe threads where pressure tight joints are made on the threads — Part 1: Taper external threads and parallel internal threads — Dimensions, tolerances and designation*

EN 12828, *Heating systems in buildings — Design for water-based heating systems*

EN 13284-1, *Stationary source emissions — Determination of low range mass concentration of dust — Part 1: Manual gravimetric method*

EN 13384-1:2002+A2:2008, *Chimneys — Thermal and fluid dynamic calculation methods — Part 1: Chimneys serving one appliance*

EN 13501-1, *Fire classification of construction products and building elements — Part 1: Classification using data from reaction to fire tests*

EN 13501-2, *Fire classification of construction products and building elements — Part 2: Classification using data from fire resistance tests, excluding ventilation services*

EN 14597, *Temperature control devices and temperature limiters for heat generating systems*

EN 14778, *Solid biofuels — Sampling*

EN 14961-1:2010, *Solid biofuels — Fuel specifications and classes — Part 1: General requirements*

EN 14961-2, *Solid biofuels — Fuel specifications and classes — Part 2: Wood pellets for non-industrial use*

EN 14961-3, *Solid biofuels — Fuel specifications and classes — Part 3: Wood briquettes for non-industrial use*

EN 14961-4, *Solid biofuels — Fuel specifications and classes — Part 4: Wood chips for non-industrial use*

EN 14961-5, *Solid biofuels — Fuel specifications and classe — Part 5: Firewood for non-industrial use*

EN 14961-6, *Solid biofuels — Fuel specifications and classes — Part 6: Non woody pellets for non-industrial use*

EN 15270, *Pellet burners for small heating boilers — Definitions, requirements, testing, marking*

EN 15456, *Heating boilers — Electrical power consumption for heat generators — System boundaries — Measurements*

CEN/TS 15883, *Residential solid fuel burning appliances — Emission test methods*

EN 60335-1, *Household and similar electrical appliances — Safety — Part 1: General requirements (IEC 60335-1)*

EN 60335-2-102:2006, *Household and similar electrical appliances — Safety — Part 2-102: Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections (IEC 60335-2-102:2004, modified)*

EN 60730-1, *Automatic electrical controls for household and similar use — Part 1: General requirements (IEC 60730-1)*

EN 60730-2-5, *Automatic electrical controls for household and similar use — Part 2-5: Particular requirements for automatic electrical burner control systems (IEC 60730-2-5)*

EN 61000-6-2, *Electromagnetic compatibility (EMC) — Part 6-2: Generic standards — Immunity for industrial environments (IEC 61000-6-2)*

EN 61000-6-3, *Electromagnetic compatibility (EMC) — Part 6-3: Generic standards — Emission standard for residential, commercial and light-industrial environments (IEC 61000-6-3)*

EN ISO 228-1, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation (ISO 228-1)*

EN ISO 228-2, *Pipe threads where pressure-tight joints are not made on the threads — Part 2: Verification by means of limit gauges (ISO 228-2)*

EN ISO 4063, *Welding and allied processes — Nomenclature of processes and reference numbers (ISO 4063:2009, Corrected version 2010-03-01)*

EN ISO 6506-1, *Metallic materials — Brinell hardness test — Part 1: Test method (ISO 6506-1)*

EN ISO 9606-2, *Qualification test of welders — Fusion welding — Part 2: Aluminium and aluminium alloys (ISO 9606-2)*

EN ISO 12100, *Safety of machinery — General principles for design — Risk assessment and risk reduction (ISO 12100)*

EN ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025)*

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

ISO 857-1, *Welding and allied processes — Vocabulary — Part 1: Metal welding processes*

ISO 857-2, *Welding and allied processes — Vocabulary — Part 2: Soldering and brazing processes and related terms*

ISO 7005-1, *Pipe flanges — Part 1: Steel flanges for industrial and general service piping systems*

ISO 7005-2, *Metallic flanges — Part 2: Cast iron flanges*

ISO 7005-3, *Metallic flanges — Part 3: Copper alloy and composite flanges*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 303-1:1999+A1:2003 and the following apply.

3.1
maximum allowable operating pressure
highest pressure at which the boiler can be operated safely

Note 1 to entry: The maximum operating pressure is less than the test pressure and the type test pressure.

3.2
test pressure
pressure to which all boilers and their parts are subjected during production at the manufacturers plant or during setting up by the installer

3.3
type test pressure
pressure to which the heating boilers and their parts are first subjected before the start of mass production at the manufacturing plant

3.4
maximum allowable temperature
maximum allowable water temperature of the heating boiler limited by safety devices

3.5
operating temperature
temperature range at which the boiler can be operated under normal operating conditions, according to the setting on the boiler water temperature controller and the manufacturer's specifications

3.6
heat output
Q
usable heat to water output delivered by a boiler per unit time in accordance with the requirements of this European Standard

Note 1 to entry: The heat output data for solid fuel boilers are the average values over a related test period which are established in accordance with the requirements of this European Standard.

3.7
nominal heat output
Q_{N}
maximum continuous heat output specified by the manufacturer for a specific fuel in accordance with the requirements of this European Standard

3.8
minimum heat output
Q_{min}
minimum heat output which is maintained automatically by the control device specified by the manufacturer for each type of fuel in accordance with the requirements of this European Standard

Note 1 to entry: The minimum heat output can be achieved in intermittent operation.

3.9
minimum continuous heat output
Q_{minC}
minimum continuous heat output which is maintained automatically by the control device specified by the manufacturer for each type of fuel in accordance with the requirements of this European Standard

3.10
heat output range
range of output between minimum and nominal to which the boiler can be adjusted and meets the requirements of this European Standard

Note 1 to entry: The heat output range lies between nominal heat output and minimum heat output.

3.11
partial load
T
quotient of heat output in the heat output range over the nominal heat output, expressed in percentage

Note 1 to entry: $T = \frac{Q}{Q_N} \times 100\ \%$

3.12
partial load operation
operating condition/state of the boiler where the heat output is less than the nominal heat output and which is reached using an automatic control device

3.13
intermittent operation
operating condition/state in which boiler heat output is controlled by the automatic connecting and disconnecting of the combustion air and/or fuel supply

3.14
heat input
Q_B
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

3.15
boiler efficiency
η_K
ratio of the delivered useful heat output to the heat input, expressed in percentage

Note 1 to entry: $\eta_K = \frac{Q}{Q_B} \times 100\ \%$

3.16
draught
pressure differential between the static air pressure in the place of installation and the static pressure of the exhaust gases (flue gas measuring section)

3.17
gas side resistance
difference in pressure that exists between the combustion chamber and the flue gas outlet of the boiler (flue gas measuring section)