SLOVENSKI STANDARD
oSIST prEN 12809:2011

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Grelni kotli na trdna goriva - Imenska grelna moč do 50 kW - Zahteve in preskusne metode

Residential independent boilers fired by solid fuel - Nominal heat output up to 50 kw - Requirements and test methods

Heizkessel für feste Brenstoffe - Nennwärmeleistung bis 50 kW - Anforderungen und Prüfungen

Chaudières domestiques à combustible solide destinées à implantées dans le volume habitable - Puissance calorifique nominale inférieure ou égale à 50 kW - Exigences et méthodes d'essai

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English Version

Residential independent boilers fired by solid fuel - Nominal heat output up to 50 kw - Requirements and test methods

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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Foreword

This document (prEN 12809:2011) has been prepared by Technical Committee CEN/TC 295 “Residential solid fuel burning appliances”, the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 12809:2001.

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.

This document is a revision of the published standard EN 12809:2001 following comments received at its 5 year review.

1 Scope

This European Standard is applicable to hand and automatically fired residential independent boilers having nominal heat outputs up to 50 kW, the primary function of which is to provide hot water for central heating and/or domestic use, and which are designed for use only with open vented systems at a working pressure not exceeding 2 bar. In addition to their primary function of providing hot water these appliances also provide space heating to the place of installation.

This European Standard specifies requirements relating to the design, manufacture, construction, safety and performance (efficiency and emission) of residential independent boilers fired by solid fuel (hereafter referred to as “appliance(s)”) and provides instructions for them. Furthermore, it also gives provisions for evaluation of conformity (i.e. initial type testing (ITT) and factory production control (FPC) and marking of these products.

These appliances may burn either solid mineral fuels, peat briquettes or natural or manufactured wood logs or be multi-fuel in accordance with the appliance manufacturer’s instructions.

This standard is not applicable to independent boilers for hot water only production and having heat outputs of less than 5 kW.

This standard is also not applicable to the design and construction of automatic stoking devices.

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 applies (including amendments).

EN 1561:1997, *Founding — Grey cast irons*

EN 1563:1997, *Founding — Spheroidal graphite cast irons*

EN 10025:1993, *Hot rolled products of non-alloy structural steels — Technical delivery conditions*

EN 10027-2:1992, *Designation systems for steels — Part 2: Numerical system*

EN 10028-2:1992, *Flat products made of steels for pressure purposes — Part 2: Non-alloy and alloysteels with specified elevated temperature properties*

EN 10029:1991, *Hot rolled steel plates 3 mm thick or above — Tolerances on dimensions, shape and mass*

EN 10088-2:1995, *Stainless steels — Part 2: Technical delivery conditions for sheet/plate and strip for general purposes*

EN 10111:1998, *Continuously hot–rolled low carbon steel sheet and strip for cold forming — Technical delivery conditions*

EN 10120:1996, *Steel sheet and strip for welded gas cylinders*

EN 60335-2-102, *Household and similar electrical appliances — Safety — Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections*

ISO 7-1:2000, *Pipe threads where pressure-tight joints are made on the threads — Part 1: Dimensions, tolerances and designation*

ISO 7-2:2000, *Pipe threads where pressure-tight joints are made on the threads — Part 2: Verification by means of limit gauges*

ISO 228-1:1994, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation*

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 331:1983, *Coal — Determination of moisture in the analysis sample — Direct gravimetric method*

ISO 334:1992, *Solid mineral fuels — Determination of total sulfur — Eschka method*

ISO 351:1996, *Solid mineral fuels — Determination of total sulfur — High temperature combustion method*

ISO 501:1981, *Coal — Determination of the crucible swelling number*

ISO 562:1998, *Hard coal and coke — Determination of volatile matter*

ISO 609:1996, *Solid mineral fuels — Determination of carbon and hydrogen — High temperature combustion method*

ISO 687:1974, *Coke — Determination of moisture in the analysis sample*

ISO 1171:1997, *Solid mineral fuels — Determination of ash content*

ISO 1928:1995, *Solid mineral fuels — Determination of gross calorific value by the bomb calorimetric method, and calculation of net calorific value*

CEN/TS 15883:2009, *Residential solid fuel burning appliances — Emission test methods*

3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply.

3.1
air inlet control
manual or automatic device to control the quantity of air supplied for combustion

3.2
ashpan
removable receptacle shaped to receive the residue falling from the firebed

3.3
ashpit
enclosed chamber designed to receive the residue or the ashpan

3.4
basic firebed
quantity of glowing embers which ensures ignition of the test fuel to be charged

NOTE The basic firebed may be specified by the manufacturer.

3.5
boiler
vessel in which water is heated, intended for fitting in or forming an integral part of a solid fuel appliance

3.6
boiler waterways
space within a boiler which contains water

3.7
bottomgrate
part of the appliance at the base of the firebox which supports the fire-bed through which the residue falls into the ashpan or ashpit and through which combustion air and/or combustion gases may be drawn

3.8
burning rate
reduction in the mass of fuel per unit of time

3.9
charging door
door which covers the refuelling opening

3.10
combustion air
air supplied to the firebox, which is entirely or partially used to burn the fuel

3.11
combustion air selector
device for adjusting the primary and/or secondary air according to the type of fuel burned

3.12
combustion control device
mechanism for setting the primary and/or secondary air in accordance with the burning rate required

3.13
combustion gases
compounds in gaseous form produced inside an appliance when fuel is burned

3.14
damper
mechanism to change the resistance to flow of the combustion gases

3.15
de-ashing
process of clearing a fuelbed and discharging residue into the collecting receptacle

3.16
de-ashing mechanism
device to agitate or disturb the ash to facilitate its removal from the firebed

NOTE It may also be used to change the bottomgrate operating position on some appliances.

3.17
direct water system
hot water system in which stored domestic hot water is heated directly by hot water circulating from the boiler

3.18
draught regulator
inlet device for admission air downstream of the firebed, enabling the flue draught to be controlled

3.19
efficiency
ratio of total heat output to total heat input during the test period expressed as a percentage

3.20
firebed; fuelbed
fuel contained in the firebox

3.21
firebox; combustion chamber
that part of the appliance in which fuel is burned

3.22
firebox opening
aperture in the firebox through which the appliance may be fuelled

3.23
firedoor
door through which the fire may be viewed and which may be opened to allow refuelling of the firebed

3.24
flue draught
differential between the static air pressure in the place of installation and the static pressure at the flue gas measurement point

3.25
flue gases
gaseous compounds leaving the appliance flue spigot and entering the flue gas connector

3.26
flue gas adaptor
fitting which allows for variations in size and shape of the flue components

3.27
flue gas connector
duct through which flue gases are conveyed from the appliance into the chimney flue

3.28
flue gas mass flow
mass of flue gas drawn off from the appliance per unit of time

3.29
flue gas temperature
temperature of the flue gas at the specified point in the measurement section

3.30
flue spigot; flue socket
integral part of the appliance for connecting the flue gas connector thus permitting the deliberate escape of products of combustion into the chimney flue

3.31
flueway
that part of the appliance designed to convey combustion gases from the firebox to the flue spigot

3.32
front firebars; deepening plate
grating or plate fitted at the front of the firebox opening to prevent spillage of fuel and ash or to change the firebox capacity, or both

3.33
fuel hopper
fuel store integral with the appliance from which fuel is fed to the firebox

3.34
fuel regulator
device for controlling the size of the firebed

3.35
heat input
quantity of energy, which the fuel provides to the appliance

3.36
heat output
quantity of useful heat released by the appliance

3.37
indirect water system
hot water system in which stored domestic hot water is heated by a primary heater through which hot water from the boiler is circulated without mixing of the primary (heating) water and the stored domestic hot water

3.38
maximum water operating pressure
limiting water pressure up to which the boiler of an appliance can be safely operated

3.39
nominal heat output
total heat output of the appliance quoted by the manufacturer and achieved under defined test conditions when burning the specified test fuel

3.40
operating tool
device supplied with the appliance for handling movable, adjustable and/or hot components

3.41
primary air
combustion air, which passes through the fuel bed

NOTE Primary air does not necessarily have separate inlets neither does it necessarily pass through a bottomgrate

3.42
recovery capability
ability of the fire to re-ignite existing or newly charged fuel after a defined burning period without external assistance

3.43
recommended fuel
fuel of commercial quality listed in the appliance manufacturer's instructions, and shown to achieve the claimed performance when tested in accordance with this European Standard

3.44
refuelling interval
period of time for which the combustion may be maintained in the appliance with a single load of fuel, without intervention by the user

3.45
residue
ashes, including combustibles, which collect in the ashpit

3.46
secondary air
air supplied for the purpose of completing the combustion of gases leaving the fuel bed

3.47
slow-combustion capability
ability of an appliance to continue operating at a low burning rate for a specified minimum period without any input of fuel and without any interference with the combustion process, in such a manner that the firebed can be recovered at the end of this period

3.48
slow combustion heat output
heat output achieved during the test period under slow combustion conditions

3.49
solid fuel
natural or manufactured solid mineral fuels, natural or manufactured wood logs and peat briquettes

3.50
solid mineral fuel
coal, lignite, coke and fuels derived from these

3.51
space-heating output
heat output provided by convection and radiation to the room

3.52
start-up device
mechanism to divert the path of the heating gases and/or change the combustion air opening cross section during the ignition period

3.53
steady-state condition
stage at which values to be measured in successive equal periods of time do not exhibit significant change

3.54
integral fuel storage container
enclosed area forming part of the appliance, but not connected directly to the fuel charging area, in which fuel is stored prior to it being physically transferred by the user to the fuel charging position

3.55
test fuel
fuel of commercial quality being characteristic of its type to be used for testing appliances

3.56
thermostat
temperature sensitive device which automatically changes the combustion air inlet cross-sectional area

3.57
total heat output
rate of useful heat released by the appliance

3.58
type test pressure
pressure to which all waterways of the test appliance are subjected

3.59
water-heating output
heat output to water averaged during the test period

3.60
working surfaces
all surfaces of an appliance designed to transmit heat to the surrounding atmosphere

NOTE All external surfaces of a heating boiler including the flue gas connector in accordance with this standard are classified as working surfaces because they are designed to transmit heat to the room in which the appliance is installed.

4 Materials, design and construction

4.1 Production documentation

The type of appliance submitted for testing shall be stated and the appliance shall be tested using the standard appropriate to that claim.

The parameters and characteristics considered in making the decisions in relation to either the family or range of appliances to be submitted for initial type testing (see 8.2.1) shall be recorded. Where changes are made to an appliance in the design, the raw material, the supplier of the components, or in the production process, which would significantly alter the performance characteristics of the appliance, especially in respect of one or more of the list of characteristics detailed in Table 9 and Table 10, (see 8.2.2) these shall be recorded. A copy of the parameters and characteristics considered in making the decisions shall be included in the production documentation for each appliance.

To identify the appliance, the manufacturer shall have available documents and/or scaled assembly drawings showing the basic design and construction of the appliance. The documentation and/or the drawings shall include at least the following information:

- the specification of the materials used in the construction of the appliance;
- the manufacturer's declared nominal heat output in kW using fuels recommended by the manufacturer together with the declared minimum refueling intervals for these fuels;
- the welding process used in the manufacture of the boiler shell;

  NOTE The symbol for the type of weld used is sufficient.
- the permissible maximum operating water temperature in °C;
- the permissible maximum water operating pressure in bar;
- the type test pressure in bar;
- the water heating output in kW.

4.2 General construction requirements

4.2.1 Design, manufacture and assembly

The shape and dimensions of the components and equipment and the method of design and manufacture, and if assembled on site the method of assembly and installation, shall ensure that when operated in accordance with the appropriate test(s) and exposed to the associated mechanical, chemical and thermal stresses, the appliance shall operate reliably and safely such that during normal operation, no combustion gases posing a hazard can escape into the room in which the appliance is installed nor can embers fall out.

Component parts such as covers, operating controls, safety devices and electrical accessories shall be arranged in such a way that their surface temperatures, under the test conditions described in A.4.7, do not exceed those specified either by the manufacturer or in the relevant component part standard.

NOTE 1 Because the entire heat dissipating surfaces of the appliance including the flue spigot/socket and the flue gas connector are working surfaces, there is no requirement for limiting the surface temperature of the appliance.

The appliance shall meet the requirements detailed in 4.3 to 4.18 as appropriate to the material of construction and intended usage.

The appliance shall be capable of operating safely at a permissible maximum water operating pressure as declared by the manufacturer of up to but not exceeding 2 bar and shall meet the requirements of the type pressure test described in 5.3.

Provision shall be made for parts which act as a seal to be located securely by means of bolts, gaskets or welding; to prevent the ingress or leakage of air, water or combustion products. Adjacent surfaces between metal components in the firebox or flueways shall be gastight.

Where a seal is made with fire-cement, the cement shall be supported by adjacent metal surfaces.

Component parts, which require periodic replacement and/or removal, shall be either designed or identified so as to ensure correct fitting.

No part of the appliance shall comprise of or contain asbestos. Hard solder containing cadmium in its formulation shall not be used.

Where thermal insulation is used, it shall be made of non-combustible material and shall not be a known hazard to health in its applied position.

NOTE 2 The thermal insulation should withstand normal thermal and mechanical stresses.

4.2.2 Durability

The durability aspects of the appliance shall be deemed to be satisfied if it is shown to meet the constructional requirements specified in 4.3 to 4.18, the safety requirements specified in Clause 5 and the performance requirements specified in Clause 6 of this standard.

NOTE The long practice with these products shows that such an approach for dealing with durability is sufficient.

4.3 Boilers constructed of steel

4.3.1 Parts subject to water pressure

One or more of the steel materials complying at least with the specifications given in Table 1 shall be used for the manufacture of those parts of the appliance subject to water pressure.

4.3.2 Nominal minimum wall thicknesses

The nominal minimum wall thickness of non-alloyed steel sheets and tubes subject to water pressure (other than immersion coils or safety heat exchangers) shall be in accordance with Table 2.

The tolerances on the nominal minimum wall thicknesses for non-alloyed steels given in Table 2 shall be as specified in EN 10029:1991.