
Naprave na trdna goriva, ki počasi oddajajo toploto – Zahteve in preskusne metode

Slow heat release appliances fired by solid fuel - Requirements and test methods

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English version

Slow heat release appliances fired by solid fuel - Requirements and test methods

Appareils de chauffage domestique à combustible solide à libération lente de chaleur - Exigences et méthodes d'essai

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Foreword

This document (prEN 15250:2005) 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.

1 Scope

This European Standard specifies requirements relating to the design, manufacture, construction, safety and performance (efficiency and emission) instructions and marking together with associated test methods and test fuels for type testing residential slow heat release appliances fired by solid fuel.

This standard is applicable to hand fuelled intermittent burning slow heat release appliances having thermal storage capacity such that they can provide heat for a period of time after the fire has gone out. These appliances provide heat into the space where they are installed.

These slow heat release appliances may be supplied either as assembled appliance or as pre-fabricated sections designed to be built on site in accordance with the manufacturer’s specified construction design. One off installations are not included.

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

This standard is not applicable to appliances with fan assisted combustion air

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 xyz:199x, *Title of the european standard.*

EN ab-c:199x, *General title of series of parts — Part c: Title of part.*

EN ISO 9001 Quality systems - Model for quality assurance in design/development, production, installation and servicing

EN 50165 Electrical equipment for non-electric appliances for household and similar purposes. Safety requirements

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.

ISO 2859 Sampling procedures for inspection by attributes

3 Terms and definitions

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

3.1

term

text of the definition

3.2

term

text of the definition

3.1

air grilles

components in the inlet and outlet openings to distribute and direct convection air flow

3.2

air inlet control

manual or automatic device which controls the quantity of air supplied for combustion

3.3

ash content of the fuel

solid matter remaining after the complete combustion of solid fuel

3.4

ashpan

removable receptacle shaped to receive the residue falling from the firebed.

3.5

ashpit

enclosed chamber designed to receive the residue or the ashpan

3.6

ashpit loss

part of the residue which is combustible

3.7

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.

3.8

batch charge

that proportion of the test load as declared by the manufacturer that can be added at specified intervals during the burning rate test period

3.9

bottomgrate

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

3.10

bottomgrate bars; firebars

bars supporting the fuelbed, separate or integral with a surrounding frame

3.11

charging door

door which covers the refuelling opening

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3.12

combustion air

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

3.13

combustion gases

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

3.14

de-ashing

process of clearing a fuelbed and discharging the residue into the collecting receptacle

3.15

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.

3.16

draught regulator

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

3.17

efficiency

ratio of total heat output to the total heat input during the burning period expressed as a percentage.

3.18

firebox; combustion chamber

that part of the appliance in which the fuel is burned

3.19

firebox opening

aperture in the firebox through which an appliance may be fuelled

3.20

firedoor

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

3.21

flue by-pass device

device which in the open position allows flue gases to pass directly to the flue spigot/socket

NOTE This can be used as a preheating aid to overcome chimney condensation.

3.22

flue damper

mechanism to change the flow of the combustion gases

3.23

flue draught

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

3.24

flue gases

gaseous compounds leaving the appliance flue spigot or socket and entering the flue gas connector

3.25

flue gas connector

duct through which flue gases are conveyed from the flue spigot of the appliance into the chimney flue

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3.26

flue gas mass flow

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

3.27

flue gas temperature

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

3.28

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

3.29

flueway

that part of an appliance designed to convey combustion gases from the firebox to the flue spigot/socket

3.30

freestanding appliance

appliance designed to operate without needing to be built into a fireplace recess or fireplace enclosure and which is not connected to the building except by the flue gas connector

3.31

front firebars

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

3.32

heat input

quantity of energy which the fuel provides to the appliance during burning

3.33

heat output

quantity of useful heat released by the appliance.

3.34

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

3.35

operating tool

device supplied with the appliance for handling movable and/or hot components

3.36

primary air

combustion air which passes through the fuel bed

3.37

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

3.38

residue

ashes, including combustibles, which collect in the ashpit

3.39

slow heat release appliance

intermittent burning appliance having thermal storage capacity to accumulate heat into its mass such that it provides heat for a period of hours, specified by the manufacturer, after the fire has gone out.

3.40**solid fuel**

naturally occurring or manufactured solid mineral fuels, natural or manufactured wood logs and peat briquettes

3.41**solid mineral fuel**

coal, lignite, coke and fuels derived from these

3.42**space heating output**

heat output provided as convection and radiation to the room

3.43**test fuel**

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

3.44**test load**

the mass of test fuel declared by the manufacturer for the burning rate test.

NOTE The test load can be added as batch charges if the manufacturer indicates this in the appliance instructions

3.45**total heat output**

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

3.46**working surfaces**

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

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

4 Materials, design and construction**4.1 Production documentation**

The manufacturer shall state the type of appliance, which he is submitting for test and the laboratory shall test the appliance 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 9.2.1) or further type testing where changes are made to an appliance (see 9.2.2) 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 fuel loading mass and if applicable the number and mass of any batch charges;

the time duration to firstly reach maximum mean surface temperature value, to secondly reach 50 % of that maximum value and finally to reach 25 % of that maximum value based upon differential surface temperatures against ambient temperatures;

the total amount of heat energy stored in the appliance during the fuel burning period

For appliances which are supplied as pre-fabricated sections designed to be built on site then the manufacturer shall provide detailed instructions for the construction of the appliance together with details of making a gas tight connection between the chimney, the flue gas connector and the appliance.

4.2 Construction

4.2.1 General construction

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 as specified in accordance with the test procedures of this standard and exposed to the associated mechanical, chemical and thermal stresses, the appliance shall operate reliably and safely such that during normal operation no combustion gas posing a hazard can escape into the room in which the appliance is installed nor can embers fall out. Non-combustible materials shall be used, except that it shall be permissible to use combustible materials for the following applications:

- components or accessories fitted outside the appliance;
- internal components of controls and safety equipment;
- operating handles;
- electrical equipment.

No part of the appliance shall comprise any material known to be harmful.

When fired with solid mineral fuels, the appliance shall have a bottomgrate and an ashpan.

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

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.

NOTE 2 All operations which the user carries out, including loading and emptying of the appliance, adjusting controls and de-ashing should be easy, safe and effective.

4.2.2 Cleaning of heating surfaces

All heating surfaces shall be accessible from the flue gas side for inspection and cleaning with brushes, scrapers or chemical agents by means of sufficient cleaning openings.

4.2.3 Flue spigot or socket

For horizontal flue connection, the flue spigot/socket shall be designed to allow fitting, internal or external, over a length of at least 40 mm, of a flue gas connector.

For vertical flue connection, the fitting shall either overlap by at least 25 mm or be designed to enable a gas tight connection to be made between the chimney, the flue gas connector and the appliance. The method of connection to enable a gas tight connection to be made shall be detailed in the appliance installation instructions.

4.2.4 Flueways

The size of the flueway in its minimum dimension shall be not less than 30 mm except for appliances designed to burn wood only when it shall be permissible to reduce it to not less than 15 mm provided easy access door(s) are provided for viewing and cleaning the whole of the flueways. It shall be possible to clean the flueways of the appliance completely using commercially available tools or brushes, unless special tools or brushes are provided by the appliance manufacturer.

4.2.5 Ashpan and ash removal

A means for the removal of the ash residue from the appliance shall be provided. When an ashpan is provided, it shall be capable of containing the combustion residue from two full charges of fuel whilst retaining sufficient space above to allow adequate primary air flow through the bottomgrate or firebed. If the ashpan resides in the appliance it shall locate in the ashpit in such a way that it allows the free passage of primary air and in such a

position that it does not obstruct any primary air inlet control.

NOTE 1 The ashpan should be designed and constructed to ensure that:

a) it effectively collects the residue from beneath the bottomgrate;

b) it can be easily and safely withdrawn, carried and emptied when hot, using the tool(s) provide, without undue spillage of residue material;

NOTE 2 The ashpan can be shovel shaped.

4.2.6 Bottomgrate

Where the bottomgrate is removable it shall be so designed or marked as to ensure correct fitting.

If a de-ashing mechanism is fitted it shall be capable of effectively de-ashing the fuelbed.

NOTE 1 The preferred design with the firedoor(s) and ashpit door(s) closed should allow de-ashing to be carried out. The de-ashing should be possible without undue effort.

NOTE 2 If it is necessary to remove the ashpit door to de-ash the fire, the appliance should be designed to minimise ash or fuel spillage during the de-ashing operation.

4.2.7 Combustion air supply

4.2.7.1 Primary air inlet control

The appliance shall be fitted with either a thermostatically controlled primary air inlet control or a manual primary air inlet control. The adjusting control shall be clearly visible or shall be permanently marked so that its operation is readily understandable.

The design shall be such that during operation of the appliance, neither ash nor unburned fuel can prevent the movement or closure of the air inlet control.

The 'cold' setting of the air inlet control shall be clearly marked and the method of adjustment shall be described in the user instructions.

The thermostat shall have a variable temperature range and be of the immersion or dry pocket type.

4.2.7.2 Secondary air inlet control

Where a secondary air inlet control is provided, the position of air entry shall be so designed that the passage of air is not restricted when the firebox is filled to the manufacturer's recommended capacity.

4.2.8 Control of flue gas

If a flue damper is fitted it shall be of a type, which does not block the flue totally. The damper shall be easy to operate and incorporate an aperture within the blade, which in a continuous area occupies at least 20 cm² or 3 % of the cross-sectional area of the blade if this is greater.

The position of the damper shall be recognizable from the setting of the device.

If a draught regulator is fitted the minimum cross sectional area requirement shall not be applicable but the device shall be easily accessible for cleaning.

4.2.9 Firedoors and charging doors

When the appliance is equipped with a charging door, that door shall be large enough to allow the appliance to be filled with the commercial fuels recommended by the manufacturer. Firedoors and charging doors shall be designed to prevent accidental opening and to facilitate positive closure.

4.2.10 Flue bypass device

Any flue bypass device shall be easily operable. The extreme positions corresponding to full opening and closing shall be stable and easily identifiable.

4.2.11 Front firebars and/or deepening plate

Front firebars shall be designed to retain the fuel or ash such that there is no undue spillage of ash or burning fuel from the slow heat release appliance during normal operations, particularly during refuelling or de-ashing.

If the appliance is fitted with removable front firebars and/or deepening plate, they shall be of a design such that they can neither be incorrectly fitted nor accidentally dislodged.

4.2.12 Solid mineral fuel and peat briquettes burning appliances

When the recommended fuels are solid mineral fuel and peat briquettes, the appliances shall have a bottomgrate and an ashpan.

5 Safety

5.1 Temperature rise in the fuel storage container (other than the fuel hopper)

When tested in accordance with A.4.6 and A.4.7, the temperatures measured in the fuel storage container shall not exceed the ambient room temperature by more than 65 K.

5.2 Temperature rise of the operating components

If the manipulation of the operating components does not require the assistance of tools, the surface temperatures, measured only in the areas to be touched, shall not exceed the ambient room temperature by more than the following when tested in accordance with A.4.6:

- 35 K for metal;
- 45 K for porcelain, vitreous enamel or similar materials;
 - 60 K for plastics, rubber or wood.

If these temperatures are exceeded, the manufacturer shall indicate in the instructions the need to use an operating tool. This tool shall be supplied with the appliance.

NOTE A suitable glove is regarded as a tool.

5.3 Temperature of adjacent combustible materials

When tested during the burning rate performance test in accordance with A.4.6, and the temperature safety test in accordance with A.4.7, and when the appliance is installed in accordance with the clearance distances specified in the manufacturer's installation instructions, the temperature of the test hearth and walls and/or ceiling or any other structure surrounding the appliance comprising combustible material shall not exceed the ambient temperature by more than 65 K.

If the temperature of the surrounding walls and/or of the floor exceeds the ambient temperature by more than 65 K, the manufacturer shall provide the necessary information for insulating the walls and/or floor or indicate the clearance distance required.

5.4 Electrical safety

The appliance shall comply with the electrical safety requirements of EN 50165 if mains operated electrical equipment is fitted as part of the appliance.

6 Performance

6.1 Flue gas temperature

When tested in accordance with A.4.6, the flue gas temperature shall be measured and the mean calculated and recorded in the installation instructions.

6.2 Carbon monoxide emission

When measured during the burning rate test in accordance with A.4.6, the mean carbon monoxide concentration calculated to 13% oxygen (O₂) content in the flue gas shall be less than or equal to the manufacturer's declared value and shall not exceed 0,3%.

Some countries have existing national legislation which set limits for maximum carbon monoxide concentration levels under nominal heat output and /or under slow or reduced combustion, in these cases the carbon monoxide level shall be measured during the burning rate test in accordance with A.4.6 for appliances sold in that country.

6.3 Efficiency

When tested during the burning rate test in accordance with A.4.6, the measured total efficiency from the mean of at least two test results shall be greater than or equal to the manufacturer's declared value and shall equal or exceed 70%.

Some countries have existing national legislation which set limits for minimum efficiency under nominal heat output and/or slow or reduced combustion, in these cases the minimum efficiency shall be determined during the burning rate test in accordance with A.4.6 for appliances sold in that country.

6.4 Flue draught

When undertaking the burning rate test in accordance with A.4.6 the flue static pressure shall be kept within (12 ± 2) Pa . Where this flue draught value needs to be exceeded in order to obtain the manufacturer's declared burning rate, the required flue draught shall be clearly stated in the appliance's installation instructions. For the temperature safety test in accordance with A.4.7 the appliance shall be tested at a flue draught 3 Pa greater than that used during the burning rate test and the static pressure shall be kept within $^{+2}_0$ Pa of this specified value.

6.5 Refuelling intervals

The manufacturer shall state the mass of the fuel load and the refuelling interval(s) and/or the number and mass of batch charges which shall be used during the burning rate test in accordance with A.4.6. Any batch charge shall be not less than 20% of the total fuel loading.

The slope formed by the test fuel load shall not obstruct, even partially, any flue.

6.6 Thermal storage capacity

The time period from the appliance achieving the maximum surface temperature and falling to 50 % of that maximum value based upon differential surface temperatures against ambient temperatures during the burning rate test in accordance with A.4.6 shall be not less than 4 hours.

The manufacturer shall also declare the total amount of heat energy stored in the appliance during the fuel burning period which shall be confirmed when the appliance is operated in accordance with the manufacturer's operating instructions during the burning rate test detailed in A.4.6.

7 Appliance instructions

7.1 General

Instructions written in the language of the country of intended destination shall accompany the appliance and shall describe the installation, operation, maintenance and, if assembled on site, the assembly of the appliance. The instructions shall not be in contradiction to the requirements or test results in accordance with this standard.

7.2 Installation instructions

The installation instructions shall contain at least the following information:

- the words "any national or local regulations, and codes of practice, shall be complied with";
- the type (model or number) of the appliance;
- the safety clearances against combustible materials, and the other protective measures that shall be taken to protect the building construction;
- the requirements for the supply of combustion air, for the simultaneous operation with other appliances and for the operation of exhaust air devices;

NOTE Extractor fans when operating in the same room or space as the appliance, may cause problems.

- the need of any air inlet grilles to be so positioned that they are not liable to blockage;
- the mass of the appliance in kg;
- the minimum flue draught for the burning rate test;
- flue gas mass flow in g/s under the output conditions of the burning rate test;
- whether the appliance is suitable for installation in a shared flue system;
- the flue gas temperature directly downstream of the flue spigot/socket in °C, under the output conditions of the burning rate test;
- the floors: the appliance shall be installed on floors with an adequate load-bearing capacity. If an existing construction doesn't meet this prerequisite, suitable measures (e.g. load distributing plate) shall be taken to achieve it;
- the assembly of the appliance on-site, if applicable;
- advice on the need to provide access for cleaning the appliance, the flue gas connector and the chimney flue;
- the installation of the damper device, if applicable;