



SLOVENSKI STANDARD

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Peči za savno na trdno gorivo - Zahteve in preskusne metode

Multi firing Sauna stoves fired by solid fuel - Requirements and test methods

Mehrfach befeuerbare Saunaöfen zur Verfeuerung fester Brennstoffe - Anforderungen und Prüfverfahren

Poêles de sauna à allumage multiple à combustible solide - Exigences et méthodes d'essai

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EUROPEAN STANDARD

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**Multi-firing sauna stoves fired by natural wood logs -
Requirements and test methods**Poêles de sauna à allumage multiple à bûches de bois
naturelles - Exigences et méthodes d'essaiMehrfach befeuerbare Saunaöfen zur Verfeuerung fester
Brennstoffe - Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 7 August 2010.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN 15821:2010) has been prepared by Technical Committee CEN/TC 295 “Residential solid fuel burning appliances”, the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by **March 2011**, and conflicting national standards shall be withdrawn at the latest by **June 2012**.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 has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of **EC Directive(s)**.

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

According to the CEN/CENELEC Internal Regulations, the national standards organizations 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 and the United Kingdom.

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1 Scope

This European Standard covers multi-firing sauna stoves in which the heating stones are separated from and indirectly heated by the fire and the flue gases and which may be re-fuelled with several fuel loads.

This European Standard specifies requirements relating to the design, manufacture, construction, safety and performance (efficiency and emission) of multi-firing sauna stoves fired by wood logs 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.

This standard is applicable to hand-fuelled intermittent burning multi-firing sauna stoves, which provide heat into the space where they are installed.

These multi-firing sauna stoves may be supplied either as an assembled appliance or as a manufacturer's pre-designed unit consisting of pre-fabricated components designed to be built on site in accordance with the manufacturer's specified assembly instructions. One-off installations are not included.

These multi-firing sauna stoves may burn only natural wood logs in accordance with the appliance operating instructions.

Single-firing heat storage sauna stoves, in which the stones are directly heated by the fire and the flue gases, which pass through them, are not covered by this European Standard. This standard is also not applicable to mechanically fed sauna stoves, sauna stoves having fan assisted combustion air, sauna stoves fitted with a boiler, sauna stoves with incorporated flue or sauna stoves having any electrical connection.

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2 Normative references (standards.iteh.ai)

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies. 7563a0ed44df/sist-en-15821-2011

EN 14774-1, *Solid biofuels — Determination of moisture content — Oven dry method — Part 1: Total moisture — Reference method*

EN 14775, *Solid biofuels — Determination of ash content*

EN 14918, *Solid biofuels — Determination of calorific value*

EN 15104, *Solid biofuels — Determination of total content of carbon, hydrogen and nitrogen — Instrumental methods*

EN 15148, *Solid biofuels — Determination of the content of volatile matter*

EN 15289, *Solid Biofuels — Determination of total content of sulphur and chlorine*

EN 60335-2-53, *Household and similar electrical appliances — Safety — Part 2-53: Particular requirements for sauna heating appliances (IEC 60335-2-53:2002)*

EN ISO 9001:2008, *Quality management systems — Requirements (ISO 9001:2008)*

ISO 2859 (all parts), *Sampling procedures for inspection by attributes*

3 Terms and definitions

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

EN 15821:2010 (E)**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**appliance family**

group of appliances of similar construction and/or performance characteristics where it is permissible to test only selected appliances in accordance with the requirements of this standard

3.4**ash content of the fuel**

solid matter remaining after the complete combustion of solid fuel

3.5**ashpan**

removable receptacle shaped to receive the residue falling from the firebed

3.6**ashpit**

enclosed chamber designed to receive the residue or the ashpan

3.7**ashpit loss**

part of the residue which is combustible

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3.8**basic firebed**

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

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NOTE The basic firebed may be specified in the operating instructions.

3.9**batch charge**

proportion of the test load as declared in the operating manual that can be added at specified intervals during the test period of the burning rate performance test

3.10**bottomgrate**

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

3.11**bottomgrate bars****firebars**

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

3.12**charging door**

door which covers the refuelling opening

3.13**combustion air**

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

3.14**combustion gases**

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

3.15**de-ashing**

process of clearing a fuelbed and discharging the 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 multi-firing sauna stoves.

3.17**draught regulator**

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

3.18**efficiency**

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

3.19**firebox****combustion chamber**

part of the multi-firing sauna stove in which the fuel is burned

3.20**firebox opening**

aperture in the firebox through which a multi-firing sauna stove may be fuelled

3.21**firedoor**

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

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3.22**flue by-pass device**

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

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

3.23**flue damper**

mechanism to change the flow of the combustion gases

3.24**flue draught**

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

3.25**flue gases**

gaseous compounds leaving the multi-firing sauna stove flue spigot or socket and entering the flue gas connector

3.26**flue gas connector**

duct through which flue gases are conveyed from the flue spigot of the multi-firing sauna stove into the chimney flue

3.27**flue gas mass flow**

mass of flue gas drawn off from the multi-firing sauna stove per unit of time

EN 15821:2010 (E)**3.28****flue gas temperature**

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

3.29**flue spigot****flue socket**

integral part of the multi-firing sauna stove for connecting the flue gas connector thus permitting the deliberate escape of products of combustion into the chimney flue

3.30**flueway**

part of a multi-firing sauna stove designed to convey combustion gases from the firebox to the flue spigot/socket

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**total heat input**

quantity of energy which the fuel provides to the multi-firing sauna stove

3.33**integral fuel storage container**

enclosed area forming part of the multi-firing sauna stove, 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

3.34**operating tool**

device supplied with the multi-firing sauna stove for handling movable and/or hot components

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3.35**primary air**

combustion air which passes through the fuel bed

3.36**recommended fuel**

fuel of commercial quality, listed in the multi-firing sauna stove operating instructions, and shown to achieve the claimed performance when tested in accordance with this European Standard

3.37**residue**

ashes, including combustibles, which collect in the ashpit

3.38**sauna stove**

stove that has a fully enclosed firebox with a firedoor which is normally closed, that distributes heat by radiation and/or convection and is also fitted with stones or other heat retaining material onto which water is poured to produce hot steam/vapour that rises from the hot sauna stones, and that may also provide hot water for washing when fitted with an optional open water vessel

3.39**multi-firing sauna stove**

sauna stove in which the stones are separated from and indirectly heated by the fire and the flue gases and which may be refuelled with several successive fuel loads also during sauna bathing

3.40**solid fuel**

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

3.41**space heating output**

heat output provided as convection and radiation to the room

3.42**test fuel**

fuel of commercial quality being representative of its type to be used for testing multi-firing sauna stoves

3.43**test load**

mass of test fuel declared in the operating instructions for the burning rate performance test

NOTE The test load can be added as batch charges if this is indicated in the multi-firing sauna stove instructions.

3.44**total heat output**

total heat output of the multi-firing sauna stove quoted in the operating instructions and achieved under defined test conditions when burning the specified test fuel and calculated as the total heat input less the flue and unburned carbon losses

3.45**water vessel**

open container in which water for washing purposes is heated and which is fitted as an option on a sauna stove

3.46**working surfaces**

surfaces of an multi-firing sauna stove designed to transmit heat to the surrounding atmosphere

4 Requirements for materials, design and construction**4.1 Production documentation**

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The type of multi-firing sauna stove submitted for testing shall be stated.

The parameters and characteristics considered in making the decisions in relation to either the family or range of multi-firing sauna stoves to be submitted for initial type testing (see 8.2.1) shall be recorded. Where changes are made to a multi-firing sauna stove 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 1 and Table 2 (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 multi-firing sauna stove.

To identify a multi-firing sauna stove, related documents and/or scaled assembly drawings shall be available showing the basic design and construction of the multi-firing sauna stove. The documentation and/or the drawings shall include at least the following information:

- the specification of the materials used in the construction of the multi-firing sauna stove;
- the fuel loading mass and, if applicable, the number and mass of any batch charges.

For multi-firing sauna stoves, which are supplied as pre-designed units consisting of prefabricated components, designed to be assembled on site, then detailed assembly instructions for the construction of the appliance shall be provided. In addition, details of making a gas tight connection between the chimney, the appliance and the flue gas connector shall also be provided. For testing purposes the multi-firing sauna stove shall be constructed and tested in accordance with these instructions.

EN 15821:2010 (E)**4.2 Construction****4.2.1 General construction****4.2.1.1 Design, manufacture and assembly**

The shape and dimensions of the components and equipment of multi-firing sauna stoves 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 multi-firing sauna stove shall operate reliably and safely so that, during normal operation, no combustion gas posing a hazard can escape into the room in which the multi-firing sauna stove is installed, nor can embers fall out. Non-combustible materials shall be used except for the following applications:

- components or accessories fitted outside the multi-firing sauna stove;
- internal components of controls and safety equipment;
- operating handles.

No part of the multi-firing sauna stove shall comprise any material known to be harmful.

Component parts of the multi-firing sauna stove, which require periodic replacement and/or removal, shall be either so designed or marked for identification to ensure correct fitting.

NOTE 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.

4.2.1.2 Durability

The durability aspects of the multi firing sauna stove shall be deemed to be satisfied if it is shown to meet the constructional requirements specified in 4.2.2 to 4.2.10, 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.

4.2.2 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

The flue spigot or socket shall be designed to enable a gas tight connection to be made between the flue gas connector and the multi-firing sauna stove.

Where the flue gas connector fits over an outlet spigot, the overlap shall be a minimum of 25 mm. Where the flues gas connector fits into a socket, the insertion depth shall be a minimum of 25 mm.

NOTE It is recommended that provision is made for sealing internal connections with heat resistant sealing compound and/or sealing rope, if required.

4.2.4 Ashpan and ash removal

A means for the removal of the ash residue from the multi-firing sauna stove 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 bottom grate or firebed. If the ashpan resides in the multi-firing sauna stove, 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.

The ashpan shall 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) provided, without undue spillage of residue material.

NOTE The ashpan can be shovel shaped.

4.2.5 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 without undue effort.

If it is necessary to remove the ashpit door to de-ash the fire, the multi-firing sauna stove shall be designed to minimise ash or fuel spillage during the de-ashing operation.

NOTE The preferred design should allow de-ashing to be carried out with the fire door(s) and ashpit door(s) closed.

4.2.6 Combustion air supply

4.2.6.1 Primary air inlet control

The multi-firing sauna stove 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 and shall be permanently marked so that its operation is readily understandable.

The design shall be such that during operation of the multi-firing sauna stove, 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 or 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.

4.2.6.2 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 recommended capacity.

4.2.7 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.

4.2.8 Fire doors and charging doors

When the multi-firing sauna stove is equipped with a charging door, that door shall be large enough to allow the appliance to be filled with the recommended commercial fuels in accordance with the user operating instructions. Fire doors and charging doors shall be designed to prevent accidental opening and to facilitate positive closure.

EN 15821:2010 (E)**4.2.9 Flue bypass device**

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

4.2.10 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 sauna stoves 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.

5 Safety requirements**5.1 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 temperature outside of the test room by more than the following when tested in accordance with A.4.6:

- 55 K for metal;
- 65 K for porcelain, vitreous enamel or similar materials;
- 80 K for plastics, rubber or wood.

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

NOTE A suitable glove is regarded as a tool.

5.2 Temperature of adjacent combustible materials

When tested during the performance test at nominal heat output 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 installation instructions, the temperature of the sauna test room walls and/or ceiling or any other structure surrounding the appliance comprising combustible material as measured by the wooden rod shall not exceed either the ambient temperature by more than 115 K during the nominal heat output test nor exceed it by 140 K during the safety test.

If, according to the installation instructions, the sauna stove can be installed on a combustible base, then the floor temperature shall be measured and the temperature shall not exceed the ambient air temperature outside the sauna test room by more than 65 K. If necessary the floor shall be protected in accordance with the installation instructions, and the temperatures shall be measured below the floor protection device.

The ambient air temperature outside the sauna test room shall be $(25 \pm 5) ^\circ\text{C}$.

6 Performance requirements**6.1 Flue gas temperature**

When tested in accordance with A.4.6, the flue gas temperature shall be measured and the mean value calculated over the nominal heat output test period and recorded in the installation instructions.

6.2 Carbon monoxide emission

When tested at the declared nominal heat output 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 declared value and shall not exceed 1,0 %.

6.3 Efficiency

When tested at the declared nominal heat output in accordance with A.4.6, the measured total efficiency derived from the mean of at least two test results shall be greater than or equal to the declared value and shall equal or exceed 50 %.

6.4 Flue draught

When undertaking the burning rate performance 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 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 value greater by 3 Pa than that used during the burning rate performance test and the static pressure shall be kept within ±2 Pa of this specified value.

6.5 Refuelling loads

The mass of the total amount of fuel and the refuelling interval(s) and/or the number and mass of batch charges, which shall be used during the burning performance test in accordance with A.4.6, shall be as stated in the operating instructions. Any batch charge shall not be less than 20 % of the total fuel load.

The minimum fuel burning period shall not be less than 30 minutes. The total amount of fuel fired shall be enough to heat up the temperature of the sauna test room to at least 90 °C.

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

6.6 Space heating output

The space heating output declared in the operating instructions and on the marking label shall not exceed the space heating output measured in accordance with A.4.6.

7 Instructions

7.1 General

Instructions, written in the language of the Member State of intended destination, shall accompany the appliance and shall describe the installation, operation, maintenance and, if assembled on site, the method of 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:

- A statement to the fact that “all local regulations, including those referring to national and European standards need to be complied with when installing the appliance”;
- The type (model or number) of the appliance;
- The nominal heat output(s) in kW or W;