



SLOVENSKI STANDARD
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Stanovanjske grelne naprave na trdna goriva - 2-4. del: Grelni kotli - Nazivna grelna moč do 50 kW

Residential solid fuel burning appliances - Part 2-4: Independent boilers - Nominal heat output up to 50 kW

Häusliche Heizgeräte für feste Brennstoffe - Teil 2-4: Heizkessel für feste Brennstoffe - Nennwärmeleistung bis 50 kW

Equipement de chauffage domestique - Partie 2-4 : Chaudières domestiques à combustible solide - Puissance calorifique nominale inférieure ou égale à 50 kW

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97.100.30 Grelniki na trdo gorivo Solid fuel heaters

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 16510-2-4

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Will supersede EN 12809:2001

English Version

Residential solid fuel burning appliances - Part 2-4: Independent boilers - Nominal heat output up to 50 kW

Équipement de chauffage domestique - Partie 2-4 :
Chaudières domestiques à combustible solide - Puissance
calorifique nominale inférieure ou égale à 50 kW

Häusliche Heizgeräte für feste Brennstoffe - Teil 2-4:
Heizkessel für feste Brennstoffe - Nennwärmeleistung bis
50 kW

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 295.

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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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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document (prEN 16510-2-4:2013) 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.

EN 13240:2001, EN 13229:2001, EN 12815:2001 and EN 12809:2001 will be totally superseded by EN 16510 series. The revision of these European Standards takes into account the comments received at their 5-year review.

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 89/106/EEC, see informative Annex ZA, which is an integral part of this document.

The structure of EN 16510, *Residential solid fuel burning appliances*, is as follows:

- Part 1: *General requirements and test methods*;
- Part 2-1: *Roomheaters*;
- Part 2-2: *Inset appliances including open fires*;
- Part 2-3: *Cookers*;
- Part 2-4: *Independent boilers – Nominal heat output up to 50 kW*.

Principally it is possible to add further parts 2 at a later stage in order to cover other residential solid fuel burning appliances such as pellet stoves or slow heat release appliances.

This Part 2-4 is to be used in conjunction with the latest edition of EN 16510-1 and its amendments. It was established on the basis of prEN 16510-1:2013.

This Part 2-4 supplements or modifies the corresponding clauses in EN 16510-1, so as to convert that publication into the European Standard: *Residential solid fuel burning appliances – Requirements and test methods for independent boilers – Nominal heat output up to 50 kW*.

When a particular subclause of Part 1 is not mentioned in this Part 2-4, that subclause applies as far as is reasonable. When this Part 2-4 states "addition", "modification" or "replacement", the relevant text in Part 1 is to be adapted accordingly.

NOTE The following numbering system is used:

- subclauses, tables and figures that are numbered starting from 101 are additional to those in Part 1;
- unless notes are in a new subclause or involve notes in Part 1, they are numbered starting from 101, including those in a replaced clause or subclause;
- additional annexes are lettered AA, BB, etc.

prEN 16510-2-4:2013 (E)**1 Scope**

This Part 2-4 of EN 16510 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.

The appliances covered by this Part 2-4 of EN 16510 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 Part 2-4 of EN 16510 is not applicable to independent boilers for hot water only production and having heat outputs of less than 5 kW.

This Part 2-4 of EN 16510 is also not applicable to the design and construction of automatic stoking devices.

2 Normative references

prEN 16510-1:2013, Clause 2, is applicable.

3 Terms and definitions

prEN 16510-1:2013, Clause 3 is applicable.

4 Classification of appliances and system boundary for roomsealed appliances

prEN 16510-1:2013, Clause 4, is applicable.

5 Materials, design and construction**5.2 General construction requirements**

prEN 16510-1:2013, 5.2 is applicable with the following modifications.

5.2.7 Bottomgrate

prEN 16510-1:2013, 5.2.7 is applicable with the following modification.

Addition:

For independent boilers a de-ashing mechanism shall be fitted where fuels other than wood are burned.

5.2.8 Combustion air supply

prEN 16510-1:2013, 5.2.8 is applicable with the following modification.

Addition of the following new subclauses

5.2.8.101 Combustion air supply for independent boilers

The supply of combustion air shall be either by natural draught or by fan assistance.

NOTE A manually adjustable air by-pass capable of being completely closed is advisable for natural draught boilers fitted with thermostatic air control.

Addition of the following new subclauses

5.2.101 Flue draught test point

A test tapping for the measurement of the flue draught shall be provided either in the boiler flueway or in the flue gas connector.

If a draught regulator is incorporated, the test measurement point shall be taken before the draught regulator.

5.2.102 Fan cut-out safety device

If the appliance is fitted with a forced draught fan to provide combustion air, then a cut-out safety device shall be provided to switch off the fan in the event of a flue blockage (see 6.101).

6 Safety requirements

prEN 16510-1:2013, Clause 6, is applicable with the following modification.

Addition of the following new subclause:

6.101 Fan cut-out safety device

Where a safety cut-out device is provided for a fan supplying forced draught combustion air as specified in 5.2.18 then when tested in accordance with A.4.101, the safety device shall switch off the fan within 15 min following obstruction of the flue.

7 Performance requirements

prEN 16510-1:2013, Clause 7, is applicable with the following modifications.

7.3 Efficiency

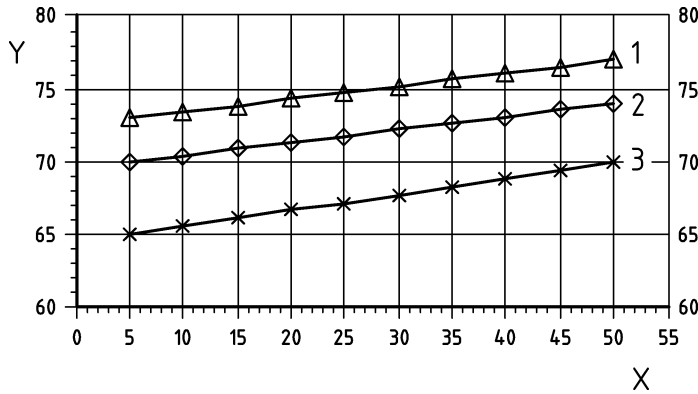
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prEN 16510-1:2013, 7.3, is applicable with the following modification.

Addition after the 1st paragraph:

The manufacturer's declared efficiency value shall be equal to or exceed the value given by the following Figure 101.

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Key

- X nominal heat output (kW)
- Y efficiency (%)
- 1 test fuels other than 2 or 3
- 2 bituminous coal, lignite briquettes & peat briquettes
- 3 wood logs

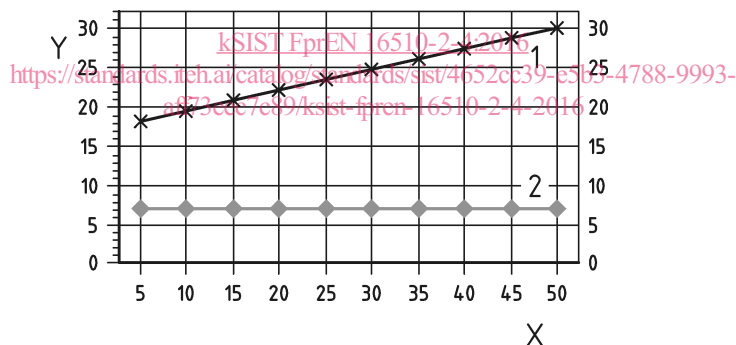
Figure 101 — Efficiency at nominal heat output

7.4 Flue draught

prEN 16510-1:2013, 7.4, is applicable with the following modifications:

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Replacement of Figure 2:



Key

- X nominal heat output (kW)
- Y flue draught (Pa)
- 1 nominal heat output test
- 2 slow combustion test

Figure 2 — Flue draught values

Replacement of paragraphs 4 to 6:

When undertaking the nominal heat output test in accordance with A.4.7 the flue static pressure shall be set to the value based upon the claimed nominal heat output as given in Figure 2 or, if necessary, such higher value specified by the manufacturer and the mean value shall be within ± 1 Pa of this specified flue draught value. During the test the individual measurements shall be kept within ± 2 Pa of this specified flue draught value.

NOTE 2 It is not allowed to set the value below that given in Figure 2 e.g. 19 Pa for a given value of 20 Pa.

For the slow combustion test in accordance with A.4.8 the static pressure shall be a target value of 6 Pa as given in Figure 1 and shall be kept within ± 1 Pa of this specified value.

For appliances having a fan assisted primary air supply, the static pressure in the measurement section shall be set to that value which gives the manufacturer's declared over-firebed pressure.

7.5 Recovery test

prEN 16510-1:2013, 7.5, is applicable with the following modification.

Replacement of paragraph 2:

Recovery shall be deemed satisfactory if a small part of the fuel is visibly ignited within 30 min with a flue draught of (6 ± 1) Pa under the test conditions specified in A.4.8.4.

7.6 Refuelling intervals

prEN 16510-1:2013, 7.6, is applicable with the following modification.

Replacement of Table 8:

Table 8 — Minimum refuelling intervals

Appliance type	Test fuel type (as detailed in Table B.1) at nominal heat output	Minimum refuelling interval hours
Batch fed appliances	Wood logs or peat briquettes	2
	All other test fuels	4
Hopper fed appliances	Anthracite	10
at slow combustion		
Batch fed appliances	Wood logs or peat briquettes	10
	All other test fuels	15
Hopper fed appliances	Anthracite	48

8 Appliance instructions

prEN 16510-1:2013, Clause 8, is applicable.

9 Evaluation of conformity

prEN 16510-1:2013, Clause 9, is applicable.

10 Marking

prEN 16510-1:2013, Clause 10, is applicable.

Annex A (normative)

Test methods

A.1 Test environment

prEN 16510-1:2013, A.1 is applicable.

A.2 Test assembly

prEN 16510-1:2013, A.2 is applicable.

A.3 Measurement equipment

prEN 16510-1:2013, A.3 is applicable.

A.4 Test procedures

prEN 16510-1:2013, A.4 is applicable with the following modifications.

A.4.7 Performance test at nominal heat output

prEN 16510-1:2013, A.4.7, is applicable with the following modifications.

A.4.7.1 General

prEN 16510-1:2013, A.4.7.1, is applicable with the following modifications.

Deletion of the 2nd paragraph

Replacement of the 4th paragraph:

The test may start from cold or may follow another test provided that the fire has been de-ashed in accordance with A.4.3 at the termination of that test. If the test is started from cold the pre-test period shall be preceded by an initial ignition and pre-test at nominal heat output. In either case the appliance is then operated for a further pre-test period or periods before commencing the test period. The duration of the pre-test period shall be sufficient to ensure that normal working conditions and a basic firebed are established.

Addition of the following last paragraph:

For appliances with fan assisted combustion air, the test shall be carried out with the fan operating continuously during the test period.

A.4.7.2 Ignition and pre-test period

prEN 16510-1:2013, A.4.7.2, is applicable with the following modifications.

Addition after the 1st paragraph:

For appliances using fan assisted combustion air supply, set the static pressure in the measurement section to that value which gives the appliance manufacturer's declared over-firebed pressure.

Addition before the last paragraph:

NOTE 101 For convenience of testing hopper fed appliances, it is permissible to operate the appliance at between 50 % and 100 % of the claimed water heating output for part of the pre-test period, and to extend the pre-test period so that the total mass of fuel consumed is the same as would be consumed by operating continuously at the claimed water heating output. If the appliance is operated at reduced water heating output during part of the pre-test period, the appliance controls and water flow rate should be adjusted to give the claimed water heating output for a period of at least 30 min prior to the end of the pre-test period.

A.4.8.3 Recovery test period

prEN 16510-1:2013, A.4.8.3, is applicable with the following modification.

Replacement:

At the end of the slow combustion test period, reset the appliance controls in accordance with the appliance manufacturer's operating instructions to give the nominal heat output. Adjust the water flow rate to that required for nominal heat output operation. De-ash and/or refuel the appliance as necessary to allow the fire to recover. Record whether the fire recovers in accordance with 7.5 and record the time taken.

A.4.9 Safety tests

prEN 16510-1:2013, A.4.9, is not applicable.

Addition of the following new subclauses

A.4.101 Test for fan cut-out safety device

A.4.101.1 General

This test is applicable only to hopper fed appliances, burning small anthracite, which are fitted with a forced draught fan providing the combustion air supply.

Install the appliance in accordance with A.2.2 taking into account the manufacturer's installation instructions. Connect the appliance to the test measurement section in accordance with A.2.3 but with the following modification:

- install a sliding flue cut-off damper assembly immediately above the appliance flue outlet as shown in Figure A.101. The hole in the damper plate shall be 5 % of the cross sectional area of the fluepipe recommended by the manufacturer.

The test shall be started from cold and consist of two parts, namely, an ignition and pre-test period, and a test period.

A.4.101.2 Ignition and pre-test period

Fill the hopper and ignite the fire in accordance with the manufacturer's operating instructions and run the appliance for a preliminary period of about 3 h with the applied draught set at (12 ± 2) Pa. Set the primary air control thermostat to give a flow temperature (16 ± 3) K above the return temperature, which shall be controlled between 50 °C and 55 °C. Adjust the water flow rate to give a water heating output of approximately 50 % of the manufacturer's claimed nominal water heating output.

At the end of the 3 h preliminary period, maintain the thermostat at the previously established setting and reduce the water heating output, by reducing the water flow rate in stages over a few hours, to give (10 ± 2) % of the manufacturer's claimed nominal water heating output. Adjust the applied draught so that the static pressure in the measurement section is set to the value required for slow combustion as stated in 6.6 and maintain within ± 1 Pa of this value.

prEN 16510-2-4:2013 (E)**A.4.101.3 Test period**

Refill the hopper at the start of the test period to between one half and three-quarters of its capacity and allow it to operate for 16 h under the conditions established at the end of the pre-test period (see A.4.101.2). Measure the water flow rate in accordance with A.4.5 and maintain it within $\pm 5\%$ of the value obtained at the end of the pre-test period.

Record the inlet and outlet water temperatures in accordance with A.4.5 and check that the mean water heating output is within the limits of $(10 \pm 2)\%$ of the nominal water heating output.

After 16 h, carry out the flue blockage test immediately on commencement of the next "fan-on" period, by pushing the blockage damper securely into position to simulate a chimney blockage condition. Measure and record the time from blockage of the flue to operation of the fan cut-out safety device. Remove the blockage damper to clear the flue.

WARNING — Care has to be taken to ensure adequate ventilation through the laboratory during the blockage period to prevent a harmful build-up of carbon monoxide. The carbon monoxide content of the atmosphere in the vicinity of the test rig should be monitored to ensure that permitted safety levels are not exceeded.

A.4.102 Type pressure test for independent boilers

Connect the boiler's inlet or outlet water tapplings to a hydraulic test rig capable of applying a test pressure of at least twice the maximum operating pressure declared by the manufacturer. Seal any unused boiler water tapplings. Apply a sustained test pressure of twice the manufacturer's declared maximum water operating pressure for a period of at least 10 min. Record whether or not the boiler shell or its water carrying components either leaked or became permanently deformed as a result of applying the test pressure.

A.5 Test results

prEN 16510-1:2013, A.5, is applicable.

A.6 Calculation methods

prEN 16510-1:2013, A.6, is applicable.

A.7 Test report

prEN 16510-1:2013, A.7, is applicable.