SLOVENSKI STANDARD
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Peči za ogrevanje na tekoča goriva z uparjalnimi gorilniki in priključkom na dimnik

Flued oil stoves with vaporizing burners

Heizöfen für flüssige Brennstoffe mit Verdampfungsbrennern und Schornsteinanschluß

Poeles a combustible liquide avec bruleurs a vaporisation raccordés a un conduit d'évacuation des produits de la combustion

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English version

Flued oil stoves with vaporizing burners

Poêles à combustible liquide avec brûleurs à vaporisation raccordés à un conduit d'évacuation des produits de la combustion

Heizöfen für flüssige Brennstoffe mit Verdampfungsbrennern und Schornsteinanschluß

This European Standard was approved by CEN on 26 February 1998.

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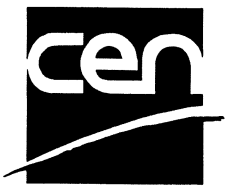

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Contents

		Page
Foreword		3
Introduction		4
1	Scope	4
2	Normative references	4
3	Definitions	4
4	Constructional requirements	5
5	Operating requirements	7
6	Tests	9
7	Marking and instructions	16
Annex A (normative) Measuring method for determining the smoke number		18
Annex B (normative) Fluid method for detecting oil derivatives		20
Annex C (informative) A-deviation		31

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 46 " Oil stoves", the secretariat of which is held by DIN.

This European Standard replaces EN 1:1980.

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of an identical text or by endorsement, at the latest by November 1998, and conflicting national standards shall be withdrawn at the latest by November 1998.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

This standard specifies the constructional and operating requirements, conditions for functional testing, and marking and instructions for flued oil stoves with vaporizing burners.

1 Scope

This standard applies to flued oil stoves with one or more vaporizing burners (hereafter referred to as 'stoves') as used for individual heating in the domestic field and having either a draught regulator or a combustion air limiter as defined in 3.13 and a nominal heating capacity of not more than 15 kW. It is not applicable for built-in equipment.

According to the type of fuels used in the country of destination, the stoves are supplied for use with either:

- fuel oil with a maximum kinematic viscosity of 6,0 mm^2/s at 20 °C;
- or kerosene with a flash point of not less than 40 °C.

These liquid fuels are hereafter called oil.

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.

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

3 Definitions

For the purposes of this standard, the following definitions apply:

3.1 flue gas: Flue gas is the products of combustion leaving the stove by means of the flue gas outlet.

3.2 flue gas mass flow: Flue gas mass flow is the mass of flue gas being evacuated over a given period of time.

3.3 steady operating condition of the stove: The operating condition of the stove corresponding to a given heat input in which the flue gas temperature in the measuring sleeve (see figure 3) does not vary by more than 5 K over a period of 15 min.

3.4 control device: The control device is a component of the oil regulator for adjusting the oil flow from a closed to a maximum open position.

3.5 maximum oil flow position: The maximum oil flow position is the control device setting with the maximum oil flow to the burner.

3.6 heating gases: Heating gases are the combustion gases flowing inside the stove.

3.7 minimum oil flow position: The minimum oil flow position is the control device setting with the minimum oil flow to the burner.

3.8 nominal heating capacity: The nominal heating capacity is the heating capacity indicated on the rating plate.

3. 9 storage tank: The storage tank is the part in the stove from which the burner is supplied with fuel.

3.10 oil derivatives: Oil derivatives are the organic substances which are deposited onto the filter paper when determining the smoke number.

3.11 oil regulator: The oil regulator is a device which ensures an adjustable, constant flow of oil to the burner.

3.12 smoke number: Smoke number (SN) is the degree of blackening which the soot causes on white filter paper under the conditions specified in this standard.

3.13 combustion air limiter: The combustion air limiter is a device for limiting the combustion air supply.

3.14 combustion air conveyor: The combustion air conveyor is a device for conveying the combustion air supply.

3.15 combustion chamber: The combustion chamber is the area in the stove where combustion takes place.

3.16 vaporizing burner: The vaporizing burner is a burner in which combustion of the fuel occurs under the effect of heat and, together with the combustion air, forms a combustible fuel vapour/air mixture.

3.17 heat input: The amount of heat supplied by the fuel on an hourly basis to the stove, calculated using the calorific value, H_i of the fuel.

3.18 heating capacity: The heating capacity is the useful amount of heat given off hourly by the stove.

3.19 efficiency: Efficiency is the ratio of the actual heating capacity to the related heat input, expressed as a percentage.

3.20 ignition device: The ignition device is a built-in device for igniting the fuel vapour/air mixture.

4 Constructional requirements

4.1 Heating capacity

The nominal heating capacity, expressed in kilowatts, shall be:

- selected by the manufacturer;
- verified during the tests;
- indicated on the rating plate.

The nominal heating capacity shall be rounded off to the nearest multiple of 500 W.

4.2 Materials

The quality of the materials as well as the shape and dimensions of the components shall ensure that, provided the operational procedures are met and with the associated mechanical, chemical and thermal stresses which occur, the stoves will remain safe and operable over a given period.

4.3 Combustion chamber

The combustion chamber shall be properly sealed and fitted with a device (e.g. lid, door, etc.) which cannot be locked, and designed to compensate for any excess pressure.

4.4 Filter

The stove shall include at least one filter situated either before or inside the oil regulator and a strainer in the filling orifice. The filter shall retain particles with a diameter of over 0,25 mm. The filter and strainer shall be easy to remove and clean.

4.5 Oil regulator

Oil regulators, or equivalent devices, shall maintain the flow of oil reaching the burner at a constant value corresponding to the setting selected.

The closed and maximum open positions shall each have a limiting stop.

The minimum position shall be clearly marked and be sensed as a resistance that can be overcome mechanically.

4.6 Marking of operating settings

The control device for the oil regulator shall have clearly visible and permanent markings.

4.7 Safety device

The stove shall have a safety device to prevent overflowing of the oil from the burner.

4.8 Fan for the supply of combustion air

Irrespective of the operating setting of the stove, the supply of combustion air from the fan shall not create excess pressure in the combustion chamber. The operation of the fan shall be trouble free.

The function of the burner shall be linked with that of the fan. In the event of a failure of the fan, the flow of oil to the burner shall be either totally interrupted or reduced to a flow such that the smoke number does not exceed the maximum permissible value for the operation of the burner without the fan.

If the fuel supply to the burner is completely cut off by an electric current failure, then for manually operated burners (without automatic ignition), when the current is restored, the fuel shall be readmitted to the burner manually. For automatically operated burners (automatic ignition), when the current is restored, the ignition without a blow-out shall be ensured.

4.9 Fuel lines

The fuel lines shall not be load-bearing parts of the construction.

The fuel lines shall be resistant to the fuel and shall not exceed the maximum permissible surface temperatures specified by the manufacturer.

Removable fuel lines shall be connected by means of metal screw threads including at least four engaged threads.

The sealing of the parts containing fuel shall be such that there is no leakage or seepage.

4.10 Storage tank

When the stove includes a storage tank, its effective capacity shall enable operation of the stove for

- at least 10 h in the case of nominal heating capacity $\leq$ 8 kW and
- at least 8 h in the case of a nominal heating capacity > 8 kW.

The filling orifice of the storage tank shall have a cap.

It shall be possible to cut off the supply of fuel from the storage tank to the burner be means of a shut-off device fitted before the oil regulator. If it is a rotary device, closing shall be by turning in a clockwise direction.

4.11 Oil-level indicator

Built-in storage tanks shall have an oil-level indicator.

4.12 Drip tray

The stove shall incorporate a drip tray, below the parts of the stove containing fuel, for the collection of any spillage, having an edge height of at least 10 mm (inside depth) and a capacity of at least 1 dm^3.

4.13 Flue outlet

The flue outlet can be of the push-on or push-in type and shall have a circular cross-section at its end and permit the attachment of a flue gas pipe, the diameter of which compiles with the applicable standards of the country in which the stove is to be installed.

It shall be possible to fit a flue pipe, having a diameter D in a length D/4, but at least 30 mm, onto or into the flue outlet.

4.14 Damper

Dampers or other movable devices for restricting the flow of flue gases are not permitted.

4.15 Draught regulators and combustion air limiters

Draught regulators shall be able to be set in a permanent manner at the maximum draught indicated by the manufacturer. This value shall be given in the installation instructions.

Draught regulators and combustion air limiters built into the stove shall be fitted at the manufacturers works and shall operate automatically.

One of these two devices shall be fitted if the stove has no fan for the supply of combustion air.

4.16 Assembly

The stove shall be supplied by the manufacturer with all parts assembled; the flue outlets and burner rings may be built in subsequently. Non-removable parts shall be securely fitted in their position of use. For removable parts, see 7.2.

4.17 Maintenance

Parts which are removable to allow for maintenance and cleaning shall be readily accessible and designed so that they can be correctly reassembled in accordance with the manufacturer's instructions.

5 Operating requirements

Under the test conditions given in clause 6, the following requirements shall be met:

5.1 Maximum oil flow

With the control device in the maximum position, the heating capacity shall be equal to, or greater than, the nominal heating capacity.

5.2 Minimum oil flow

With the control device in the minimum position, the average hourly oil flow shall not exceed one third of the nominal flow at nominal heating capacity. Stoves having a maximum flow of 0,200 kg/h in the minimum setting are excluded from this requirement.

If the control device of oil-fired heating appliances is reduced by hand, the maximal rate shall not be more than 50 % of the oil rate per hour at nominal heat input.

5.3 Ignition

It shall be possible easily to light the burner from cold following the manufacturer's operating instructions.

5.4 Efficiency

The efficiency obtained at maximum oil flow shall not be less than 75%.

5.5 Smoke number

At all rates of operation, the smoke number shall not exceed 3, when the stove is burning fuel oil, and 2, when it is burning kerosene. Flue gases shall be free from oil derivatives.

Under the test conditions defined in 6.5.1.2, 6.5.1.4 and 6.5.3.1, a smoke number which is one point higher is permissible in the case of fuel oil.

5.6 Flue gas temperature

During the tests, the flue gas temperature shall not be less than 90 K, nor more than 350 K, above the ambient temperature.

5.7 Carbon monoxide content of the flue gas

The emission of carbon monoxide (CO) in the flue gases, of an amount of fuel corresponding to 1 MJ (based on H_i) , shall not exceed the value of 0,4 g/MJ at all rates of operation.

This value shall be calculated as the mean value from the tests as described in 6.5.2.1, 6.5.2.2 and 6.5.3.2.

5.8 Oil temperature

The temperature of the fuel in the built-in storage tank and oil regulator shall not exceed 20 K above ambient temperature for fuel oil, or 15 K above ambient temperature for kerosene.

5.9 Floor temperature

The surface temperatures of the underside of the drip tray, shall not exceed 45 K above ambient temperature when using fuel oil, or 35 K above ambient temperature when using kerosene.

The surface temperatures of the floor shall not exceed 60 K above ambient temperature.

5.10 Wall temperature

The surface temperatures of the walls, behind and adjacent to the stove, shall not exceed 60 K above ambient temperature at the minimum clearances given by the manufacturer in the installation instructions under the test conditions described in 6.5.

5.11 Temperature of the control knobs

The temperatures of the control knobs on their contact surface shall not exceed ambient temperature by more than:

- 35 K for metals
- 45 K for porcelain
- 60 K for plastics

This also applies to other similar materials.

These temperatures may be exceeded if the stove is supplied with an accessory with which it is possible to operate the adjustment devices easily and without the risk of burning. The tests shall be carried out as described in 6.5.2.1.

5.12 Draught regulator

The draught regulator shall be inoperative during the tests.

If a locking device is available, this shall be locked during the tests and unlocked, if necessary, when the stove is installed.

5.13 Electrical safety

Heating appliances with electrical equipment shall comply with EN 50165 [1)]

6 Tests

6.1 Test apparatus

6.1.1 General

The stove shall be installed on the test apparatus (see figure B.1) and connected to the test chimney by means of a measuring sleeve (see figures B.2 and B.3). The test floor and walls together with the accessories shall be as shown in figure 4.

The measuring equipment shall meet the following requirements:

CO_2 concentration of flue gases

Continuous recording equipment for determining the CO_2 content with a measuring tolerance of max. ± 0,2 % by volume.

CO concentration of the flue gases

Continuous recording equipment for determining the CO content with a measuring tolerance of max. ± 0,005 % by volume.

Temperature measuring devices

Continuous recording equipment for determining the flue gas temperature with a measuring tolerance of max. ± 2,5 K.

Continuous recording equipment for determining the ambient temperature with a measuring tolerance of max. ± 0,5 K.

[1)] A manufacturer's declaration in accordance with the Low Voltage Directive is adequate as proof of compliance with this standard.

Equipment for measuring the fuel temperature in the storage tank and oil regulator, the temperature of the fuel lines, on the floor, on the underside of the drip tray, the test wall temperatures and the control knobs with a measuring tolerance of ± 1 K.

Measurement of the draught

Continuous recording equipment for determining the draught during operation and with a measuring tolerance of max. ± 0,5 Pa.

Measurement of the smoke number

Intermittent recording equipment or manually operated device as shown in annex A for recording at least one measured value in a 15 min period.

Measurement of the quantity of fuel supplied

Gravimetric measuring process for determining the quantity of fuel supplied with a measuring tolerance of ± 10 g and a scale graduation of 2 g, or an equivalent volumetric measuring process.

6.1.2 Testing of stoves having several possible outlet connections

If the stove to be tested has several possible outlet connections, the tests described in 6.5.1.1 to 6.5.3.3 shall be carried out on one outlet connection. For each of the other possible outlet connections, the sort-term tests as described in 6.5.1 shall be carried out without altering the oil flow in the oil regulator. For all possible outlet connections, the nominal heating capacity shall be attained and the specifications for operational use as defined in clause 4 shall be complied with.

6.2 Test fuel

The test fuel used in the tests shall have characteristics corresponding to the average fuel available in the country of destination. The fuels used are:

- fuel oil having a viscosity of (5,0 ± 0,5) mm^2/s at 20 °C and a density of (0,84 ± 0,02) kg/dm^3 at 15 °C;
- kerosene satisfying the regulations valid in the country where the stove is to be used.

The test fuel shall be defined by the following dimensions, which are given in the test report:

- Density at 15 °C — kg/m^3;
- Viscosity at 20 °C — mm^2/s;
- Carbon content — % by mass;
- Hydrogen content — % by mass;
- Sulphur content — % by mass;
- Calorific value H_i — kJ/kg.

6.3 Verification of construction

By visual inspection or, if necessary, during the operational tests, it shall be ascertained whether the requirements given in clause 4 have been met.

6.4 Testing of leak-tightness of the fuel circuit

During the tests, it shall be verified that there is no leakage or seepage of fuel.