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SLOVENSKI STANDARD
SIST EN 778:2010

01-februar-2010

Nadomeşča:
SIST EN 778:1999
SIST EN 778:1999/A1:2002

Plinski gospodinjski grelniki zraka s prisilno konvekcijo za gretje prostorov z imensko močjo do vključno 70 kW brez ventilatorja za zgorevalni zrak in/ali produkte zgorevanja

Domestic gas-fired forced convection air heaters for space heating not exceeding a net heat input of 70 kW, without a fan to assist transportation of combustion air and/or combustion products

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Gasbefeuerte Warmlufterzeuger mit erzwungener Konvektion zum Beheizen von Räumen für den häuslichen Gebrauch mit einer Nennwärmebelastung nicht über 70 kW, ohne Gebläse zur Beförderung der Verbrennungsluft und/oder der Abgase

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Générateurs d'air chaud à convection forcée utilisant les combustibles gazeux pour le chauffage de locaux à usage d'habitation de débit calorifique sur Hi inférieur ou égal à 70 kW, sans ventilateur pour aider l'alimentation en air comburant et/ou l'évacuation des produits de combustion

Ta slovenski standard je istoveten z: **EN 778:2009**

ICS:

97.100.20	Plinski grelniki	Gas heaters

SIST EN 778:2010 **en,fr,de**

2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 778

October 2009

ICS 97.100.20

Supersedes EN 778:1998

English Version

Domestic gas-fired forced convection air heaters for space heating not exceeding a net heat input of 70 kW, without a fan to assist transportation of combustion air and/or combustion products

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This European Standard was approved by CEN on 12 September 2009.

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Foreword

This document (EN 778:2009) has been prepared by Technical Committee CEN/TC 180 “Domestic and non-domestic gas fired air heaters and non-domestic gas fired overhead radiant heaters”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by April 2010, and conflicting national standards shall be withdrawn at the latest by April 2010.

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 supersedes EN 778:1998.

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, and Annex ZB, which are integral parts of this document.

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This revision modifies EN 778:1998. It has been prepared to incorporate requirements for combustion products evacuation ducts, POCEDs, supplied as an integral part of the system to support the EU Directive 89/106/EEC on construction products under mandate M 105. To this end, it extends the scope of the standard to cover type B_4 appliances.

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Furthermore, the opportunity presented by this revision has been taken to update the standard in respect to EN 437:2003.

NOTE For countries requesting special categories (specified in EN 437:2003), the absence of specific information concerning A.3.3 and A.3.4 implies that the general requirements described in the body of the standard (see 4.1.1, 4.2.2, 4.2.3 and 4.2.5) also apply to these special categories.

— EN 525, *Non-domestic direct gas-fired forced convection air heaters for space heating not exceeding a net heat input of 300 kW*

— EN 621, *Non-domestic gas-fired forced convection air heaters for space heating not exceeding a net heat input of 300 kW, without a fan to assist transportation of combustion air and/or combustion products*

— EN 1020, *Non-domestic gas-fired forced convection air heaters for space heating not exceeding a net heat input of 300 kW, incorporating a fan to assist transportation of combustion air and/or combustion products*

— EN 1196, *Domestic and non-domestic gas-fired air heaters — Supplementary requirements for condensing air heaters*

— EN 1319, *Domestic gas-fired forced convection air heaters for space heating, with fan-assisted burners not exceeding a net heat input of 70 kW*

— EN 12669, *Direct gas-fired hot air blowers for use in greenhouses and supplementary non-domestic space heating*

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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, 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 specifies the requirements and test methods for the safety and efficiency of domestic gas-fired air heaters with (an) atmospheric burner(s) and without a fan to assist the transportation of combustion air and/or flue gases, hereafter referred to as "appliances".

This European Standard applies to Type B_{11}, B_{11AS}, B_{11BS}, B_{41}, B_{41AS}, B_{41BS} C_{11}, C_{21}, C_{31} and C_{41} appliances with an input not exceeding 70 kW (net cv-basis), intended primarily for use in single unit residential dwellings. Provision of the heated air may be by means of ducting.

This European Standard does not apply to:

a) appliances of the condensing type;

b) appliances for outdoor installation;

c) dual purpose air conditioning appliances (heating and cooling);

d) appliances where the air is heated by an intermediate fluid;

e) appliances with forced draught burners;

f) appliances fitted with a manual or automatic means of adjusting the combustion air supply or the combustion products evacuation (including flue dampers);

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g) portable or transportable forced convection appliances;

h) appliances having multiple heating units with a single draught diverter;

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i) appliances fitted with more than one flue outlet;

j) C_{21} and C_{41} appliances for 3rd family gases;

NOTE For C_{41} appliances, see all requirements and test methods that are valid for C_{21} appliances, unless otherwise stated.

k) appliances that are designed for continuous condensation within the flue system under normal operating conditions;

l) appliances having Products Of Combustion Evacuation Ducts (POCED), that are non-metallic.

This European Standard is applicable to appliances which are intended to be type tested. It also includes requirements concerning the evaluation of conformity, including factory production control, but these requirements only apply to POCEDs and their associated terminals.

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2 Normative references

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.

EN 88-1:2007, *Pressure regulators and associated safety devices for gas appliances — Part 1: Pressure regulators for inlet pressures up to and including 500 mbar*

EN 125:1991, *Flame supervision devices for gas burning appliances — Thermo-electric flame supervision devices*

EN 126:2004, *Multifuctional controls for gas burning appliances*

EN 161:2007, *Automatic shut-off valves for gas burners and gas appliances*

EN 257:1992, *Mechanical thermostats for gas-burning appliances*

EN 298:2003, *Automatic gas burner control systems for gas burners and gas burning appliances with or without fans*

EN 437:2003, *Test gases — Test pressures — Appliance categories*

EN 1859:2000, *Chimneys — Metal Chimneys — Test methods*

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EN 10226-1:2004, *Pipe threads where pressure tight joints are made on the threads — Part 1: Taper external threads and parallel internal threads — Dimensions, tolerances and designation*

EN 10226-2:2005, *Pipe threads where pressure tight joints are made on the threads — Part 2: Taper external threads and taper internal threads — Dimensions, tolerances and designation*

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EN 60335-1:2002, *Household and similar electrical appliances — Safety — Part 1: General requirements (IEC 60335-1:2001, modified)*

EN 60335-2-102:2006, *Household and similar electrical appliances — Safety — Part 2-102: Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections (IEC 60335-2- 102:2004, modified)*

EN 60529:1992, *Degrees of protection provided by enclosures (IP code) (IEC 60529:1989)*

EN 60730-1:2000*, Automatic electrical controls for household and similar use — Part 1: General requirements (IEC 60730-1:1999, modified)*

EN 60730-2-1:1997, *Automatic electrical controls for household and similar use — Part 2-1: Particular requirements for electrical controls for electrical household appliances (IEC 60730-2-1:1989, modified)*

EN 60730-2-9:2002, *Automatic electrical controls for household and similar use — Part 2-9: Particular requirements for temperature sensing controls (IEC 60730-2-9:2000, modified)*

EN 61058-1:2002*, Switches for appliances — Part 1: General requirements (IEC 61058-1:2000 + A1:2001, modified)*

EN ISO 228-1:2003, Pipe *threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation (ISO 228-1:2000)*

EN ISO 3166-1:2006, *Codes for the representation of names of countries and their subdivisions Part 1: Country codes (ISO 3166-1:2006)*

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EN ISO 6976:2005, *Natural gas — Calculation of the calorific value, density, relative density and Wobbe index from composition (ISO 6976:1995 including Corrigendum 1:1997, Corrigendum 2:1997 and Corrigendum 3:1999)*

ISO 1182:2002, *Reaction to fire tests for building products — Non-combustibility test*

ISO 7005-1:1992, *Metallic flanges — Part 1: Steel flanges*

ISO 7005-2:1988, *Metallic flanges — Part 2: Cast iron flanges*

ISO 7005-3:1988, *Metallic flanges — Part 3: Copper alloy and composite flanges*

CR 1404, *Determination of emissions from appliances burning gaseous fuels during type-testing*

3 Terms and definitions

3.1 Appliance and its constituent parts

3.1.1
domestic air heater
appliance designed for the heating by means of warm air and possibly ventilation of a single unit residential dwelling

3.1.2
forced convection air heater
appliance designed to provide space heating from a central source by distributing heated air, by means of an air moving device, either through ducting or directly into the heated space

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3.1.3
gas inlet connection
part of the appliance intended to be connected to the gas supply

3.1.4
mechanical joint
mechanical means of obtaining soundness
means of ensuring the soundness of an assembly of several (generally metallic) parts without the use of liquids (e.g. pastes and tapes)

EXAMPLE metal to metal joints; conical joints; toroidal sealing rings (“O” rings); flat joints

3.1.5
gas circuit
part of the appliance that conveys or contains the gas between the appliance gas inlet connection and the burner(s)

3.1.6
restrictor
device with an orifice, which is placed in the gas circuit so as to create a pressure drop and thus reduce the gas pressure at the burner to a predetermined value for a given supply pressure and rate

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3.1.7
gas rate adjuster
component allowing an authorized person to set the gas rate of the burner to a predetermined value according to the supply conditions

NOTE 1 Adjustment may be progressive (screw adjuster) or in discrete steps (by changing restrictors).

NOTE 2 The adjusting screw of an adjustable regulator is regarded as a gas rate adjuster.

NOTE 3 The action of adjusting this device is called "adjusting the gas rate".

NOTE 4 A factory sealed gas rate adjuster is considered to be non-existent.

3.1.8
setting an adjuster
immobilization of an adjuster (by some means such as e.g. a screw) after the manufacturer or installer has adjusted it setting an adjuster

3.1.9
sealing an adjuster
setting of an adjuster using a material such that any attempt to change the adjustment breaks the sealing material and makes the interference with the adjuster apparent;

the adjuster is then said to be "sealed" in its adjustment position

NOTE 1 A factory sealed adjuster is considered to be non-existent.

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NOTE 2 A regulator is considered to be non-existent if it has been factory sealed in a position such that it is not operational in the range of supply pressures corresponding to the appliance category.

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putting an adjuster or a control out of service
putting an adjuster or a control (e.g. of temperature, pressure) out of action and sealing it in this position

the appliance then functions as if the adjuster or control had been removed

3.1.11
injector
component that admits the gas into a burner

3.1.12
main burner
burner that is intended to assure the thermal function of the appliance

3.1.13
ignition device
any means (e.g. flame, electrical ignition device or other device) used to ignite the gas at the ignition burner or at the main burner

NOTE This device can operate intermittently or permanently.

3.1.14
ignition burner
burner whose flame is intended to ignite another burner

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3.1.15
aeration adjuster
device enabling the air to be set at the desired value according to the supply conditions

NOTE The action of adjusting this device is called "adjusting the aeration".

3.1.16
combustion circuit
combustion circuit comprises the air supply circuit, the combustion chamber, the heat exchanger and the combustion products evacuation circuit so far as this is part of the appliance

3.1.17
combustion chamber
enclosure inside which combustion of the air-gas mixture takes place

3.1.18
flue outlet
part of an appliance that connects with a flue to evacuate the products of combustion

3.1.19
draught diverter
device placed in the combustion products circuit to reduce the influence of flue-pull and that of down-draught on the burner performance and combustion

3.1.20
flue terminal
device fitted at the end of the duct system which enables the discharge of flue gases and may, at the same time, allow entry of combustion air

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3.1.21
POCED
combustion products evacuation duct that is intended to be used only with a specific appliance/system; this duct being either supplied with the appliance/system or specified in the manufacturers instructions

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3.2 Adjustment, control and safety devices

3.2.1
range rating device
component on the appliance intended to be used by the installer to adjust the heat input of the appliance, within a range of heat inputs stated by the manufacturer, to suit the actual heat requirements of the installation

NOTE This adjustment may be progressive (e.g. by use of a screw adjuster) or in discrete steps (e.g. by changing restrictors).

3.2.2
automatic burner system
burner system in which, when starting from the completely shut-down condition, the start–gas flame is detected and proved and the main gas valve(s) is(are) actuated without manual intervention

3.2.3
automatic burner control system
system comprising at least a programming unit and all the elements of a flame detector device;

the various functions of an automatic burner control system may be in one or more housings [EN 298:2003]

3.2.4
non-automatic burner control system
burner system with an ignition burner which is ignited manually

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3.2.5
programming unit
device which reacts to signals from control and safety devices, gives control commands, controls the start-up sequence, supervises the burner operation and causes controlled shut-down, and if necessary safety shut-down and lock-out;

the programming unit follows a predetermined sequence of actions and always operates in conjunction with a flame detector device [EN 298:2003]

3.2.6
Programme
sequence of control operations determined by the programming unit involving switching on, starting up, supervising and switching off the burner;

safety actions such as safety shut down and lock out are also part of the programme [EN 298:2003]

3.275
flame detector device
device by which the presence of a flame is detected and signalled;

it can consist of a flame sensor, an amplifier and a relay for signal transmission. These parts, with the possible exception of the actual flame sensor, may be assembled in a single housing for use in conjunction with a programming unit [EN 298:2003]

3.2.8
flame signal
signal given by the flame detector device, normally when the flame sensor senses a flame [EN 298:2003]

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3.2.9
flame simulation
condition which occurs when the flame signal indicates the presence of a flame when in reality no flame is present [EN 298:2003]

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3.2.10
pressure regulator[1)]
device which maintains the outlet pressure constant independent of the variations in inlet pressure and/or flow rate within defined limits

3.2.11
adjustable pressure regulator
regulator provided with means for changing the outlet pressure setting

3.2.12
flame supervision device
device that, in response to a signal from the flame detector, keeps the gas supply open and shuts it off in the absence of the supervised flame

3.2.13
automatic shut-off valve
valve designed to open when energized and to close automatically when de-energized

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1) The term "regulator" is used in this case and for a volume regulator.

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3.2.14
room temperature control thermostat
device controlling the operation of the appliance (by on/off, high/low or modulating control) and enabling the room temperature to be kept automatically, within a given tolerance, at a predetermined value

3.2.15
overheat cut-off device
device that shuts off and locks out the gas supply before the appliance is damaged and/or before safety is put into question, and that requires manual intervention to restore the gas supply

3.2.16
temperature limiter
device which is intended to keep a temperature below one particular value during normal operation conditions and which may have a provision for setting by the user

3.2.17
overheat limit device
device which is intended to keep a temperature below one particular value during abnormal operation conditions and which has either no provision for setting or is provided with a maximum temperature limit stop

NOTE The overheat limit device may be of the automatic or the manual reset type.

3.2.18
fan control
control that starts and/or stops the air delivery fan when the temperature of the delivered air reaches certain predetermined values

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3.2.19
temperature sensing element; temperature sensor
component that detects the temperature of the environment to be supervised or controlled

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3.2.20
combustion product discharge safety system
system that automatically shuts off the gas supply to the main burner, and perhaps to the ignition burner, when spillage of combustion products from the draught diverter is detected

3.2.21
atmosphere sensing device
device designed to shut off the gas supply before the concentration of combustion products of the surrounding atmosphere reaches a set value

3.2.22
modulating control
automatic control by which the heat input of the appliance can be varied in a continuous manner between the nominal heat input and a minimum value

3.2.23
high/low control
automatic control which permits an appliance to operate either at the nominal heat input or at a fixed reduced heat input

3.2.24
closed position indicator switch
switch fitted to an automatic shut-off valve which indicates when the closure member is in the closed position

3.2.25
proof of closure switch
switch fitted to an automatic shut-off valve with mechanical overtravel which indicates when the closure member is in the closed position

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3.2.26
valve proving system
system to check the effective closure of automatic shut-off valves

3.3 Operation of the appliance

3.3.1
volume flow rate
V
volume of gas consumed by the appliance in unit time during continuous operation

NOTE The volume flow rate is expressed in cubic metres per h (m^3/h), litres per min (l/min), cubic decimetres per h (dm^3/h) or cubic decimetres per second (dm^3/s). [EN 437:2003]

3.3.2
mass flow rate
M
mass of gas consumed by the appliance in unit time during continuous operation

NOTE The mass flow rate is expressed in kilograms per hour (kg/h) or grams per hour (g/h). [EN 437:2003]

3.3.3
heat input
Q
quantity of energy used in unit time corresponding to the volumetric or mass flow rates: the calorific value used being the net or gross calorific value

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NOTE The heat input is expressed in kilowatts (kW). [EN 437:2003]

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3.3.4
nominal heat input
Q_n
value of the heat input (kW) declared by the manufacturer

3.3.5
flame stability
characteristic of flames which remain on the burner ports or in the flame reception zone intended by the construction

3.3.6
flame lift
total or partial lifting of the base of the flame away from the burner port or the flame reception zone provided by the design

NOTE Flame lift may cause the flame to blow out (i.e. extinction of the air-gas mixture).

3.3.7
light-back
entry of a flame into the body of the burner

3.3.8
light-back at the injector
ignition of the gas at the injector, either as a result of light-back into the burner or by the propagation of a flame outside the burner

3.3.9
sooting
phenomenon appearing during incomplete combustion and characterized by deposits of soot on the surfaces or parts in contact with the combustion products or with the flame