SLOVENSKI STANDARD
SIST EN 525:2009

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Nadomeġļ a:
SIST EN 525:1999

Plinski grelniki zraka s prisilno konvekcijo za gretje nestanovanjskih prostorov z imensko moļ jo do vkljuļ no 300 kW brez prenosnika toplote

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

Gasbefeuerte Warmlufterzeuger ohne Wärmetauscher mit erzwungener Konvektion zum Beheizen von Räumen für den nicht-häuslichen Gebrauch mit einer Nennwärmebelastung nicht über 300 kW

Générateurs d'air chaud a chauffage direct et a convection forcée utilisant les combustibles gazeux pour le chauffage de locaux a usage non-domestique, de débit calorifique sur Hi inférieur ou égal a 300 kW

Ta slovenski standard je istoveten z: **EN 525:2009**

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97.100.20	Plinski grelniki	Gas heaters

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EUROPEAN STANDARD

NORME EUROPÉENNE

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English Version

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This European Standard was approved by CEN on 30 April 2009.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN 525:2009) has been prepared by Technical Committee CEN/TC 180 “Domestic and non-domestic 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of an identical text or by endorsement, at the latest by November 2009, and conflicting national standards shall be withdrawn at the latest by November 2009.

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 525:1997.

The test gases, test pressures and appliance categories given in this European Standard are in accordance with those specified in EN 437:2003.

Other European Standards covering gas-fired air heaters are:

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 778 *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*

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*

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 90/396/EEC.

For relationship with EC Directive 90/396/EEC, 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, 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.

1 Scope

This European Standard specifies the requirements and test methods for the safety of non-domestic direct gas-fired forced convection air heaters having fully automatic control systems, hereafter referred to as "appliances".

This European Standard applies to appliances of Type A_2 and Type A_3 with heat input based on the net calorific value of 300 kW or less fitted with integral burners intended for use other than in residential dwellings. It also applies to appliances designed for outdoor installation. For indoor appliances provision of the heated air may be by means of ducting or may be directly into the heated space.

This standard does not apply to:

a) appliances intended for use in residential dwellings;

b) portable or transportable forced convection appliances;

c) appliances fitted with gas boosters;

d) appliances fitted with air/gas ratio controls;

e) appliances which incorporate a main burner having more than one section under a common burner control, of which one or more sections may be extinguished whilst another section remains in operation.

This European Standard is applicable to appliances which are intended to be type tested.

NOTE Requirements for appliances which are not type tested would need to be subject to further consideration.

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

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

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

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

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

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*

EN 60335-1:2002, *Safety of household and similar electrical appliances - Part 1: General requirements*

EN 60335-2-102:2006, *Electrical equipment of non-electric heating appliances for household and similar appliances*

EN 60529:1991, *Degrees of protection provided by enclosures (IP code)*

EN 60730-1:2000, *Automatic electrical controls for household and similar use - Part 1: General requirements*

EN 60730-2-1:1997, *Automatic electrical controls for household and similar use - Part 2: Particular requirements for electrical controls for electrical household appliances*

EN 60730-2-9:2002, *Automatic electrical controls for household and similar use - Part 2: Particular requirements for temperature-sensing controls*

EN 61058-1:2002, *Switches for appliances - Part 1: General requirements*

EN 61558-2-6:1997, *Safety of power transformers, power supply units and similar – Part 2-6:. Particular requirements for safety isolating transformers for general use*

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)*

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 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*

3 Terms and definitions

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

3.1 Appliance and its constituent parts

3.1.1
non-domestic air heater
appliance designed for the heating and/or ventilation of a building other than a 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

3.1.3
direct fired forced convection air heater
forced convection air heater in which the products of combustion mix with the heated air being supplied to the space

3,1,4
high temperature direct fired forced convection air heater

direct fired forced convection air heater designed to operate with an air temperature rise through the appliance greater than 60 K

3.1.5
low temperature direct fired forced convection air heater
direct fired forced convection air heater designed to operate with a maximum air temperature rise through the appliance of 60 K or less

3.1.6
appliance with facility for downstream re-circulation of air
appliance in which a proportion of the heated air can be returned to the appliance at a point down stream of the burner and re-distributed

3.1.7
appliance with facility for upstream re-circulation of air
appliance in which a proportion of the heated air can be returned to the appliance at a point upstream of the burner and re-distributed.

3.1.8
profile plates
fixed or adjustable plates fitted for the purpose of setting the air flow velocity across the burner

3.1.9
gas inlet connection
part of the appliance intended to be connected to the gas supply

3.1.10
combustion chamber
part of the appliance in which the principal combustion process takes place

3.1.11
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); or flat joints.

3.1.12
gas circuit
part of the appliance that conveys or contains the gas between the appliance gas inlet connection and the burner(s)

3.1.13
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

3.1.14
gas rate adjuster
component allowing an authorised person to set the gas rate of the burner to a predetermined value according to the supply conditions

NOTE 1 Adjustment can 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.

3.1.15
setting an adjuster
immobilizing a gas rate adjuster (by some means such as e.g. a screw) after the gas rate has been adjusted by the manufacturer or installer

3.1.16
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

NOTE 1 The adjuster is then said to be "sealed" in its adjustment position.

NOTE 2 A factory sealed adjuster is considered to be non-existent.

NOTE 3 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.

3.1.17
putting an adjuster or a control out of service
adjuster or a control (e.g. of temperature or pressure) is said to be “put out of service” if it is put out of action and sealed in this position

NOTE The burner unit then functions as if this device has been removed.

3.1.18
injector
component that admits the gas into a burner

3.1.19
main burner
burner that is intended to assure the thermal function of the appliance and is generally called the burner

3.1.20
ignition device
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

3.1.21
ignition burner
burner whose flame is intended to ignite another burner

3.1.22
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".

3.1.23
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 Adjustment, control and safety devices

3.2.1
automatic burner control system
system comprising at least a programming unit and all the elements of a flame detector device

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

3.2.2
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

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

3.2.3
programme
sequence of control operations determined by the programming unit involving switching on, starting up, supervising and switching off the burner

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

3.2.4
flame supervision
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

3.2.5
flame detector device
device by which the presence of a flame is detected and signalled

NOTE 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].

3.2.6
flame signal
signal given by the flame detector device, normally when the flame sensor senses a flame [EN 298:2003]

3.2.7
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]

3.2.8
pressure regulator
device which maintains the outlet pressure constant independent of the variations in inlet pressure and/or flow rate within defined limits

3.2.9
adjustable pressure regulator
regulator provided with means for changing the outlet pressure setting

3.2.10
volume regulator
device which maintains the gas rate constant within a given tolerance, independent of the upstream pressure

3.2.11
automatic shut-off valve
valve designed to open when energized and to close automatically when de-energized

3.2.12
control thermostat
device controlling the operation of the appliance (by on/off, high/low or modulating control) and enabling the temperature to be kept automatically, within a given tolerance, at a predetermined value

3.2.13
overheat cut-off device
device that shuts off and locks out the gas supply before the appliance is damaged and/or before safety is compromised and which requires manual intervention to restore the gas supply

NOTE This device is preset and sealed by the appliance manufacturer.

3.2.14
temperature sensing element; temperature sensor
component that detects the temperature of the environment to be supervised or controlled

3.2.15
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

3.2.16
high/low control
automatic control which permits an appliance to operate either at the nominal heat input or at a fixed reduced heat input.

3.2.17
vent valve
normally open automatic valve fitted between two automatic shut-off valves and intended to vent any small leakages of gas

3.2.18
air flow proving device
device which monitors and proves the existence of an adequate flow of air for combustion and, where appropriate, for dilution

3.2.19
proof of closure indicator
device fitted to a Class A, B or C automatic shut-off valve with mechanical overtravel which proves the valve to be in the closed position

3.2.20
closed position indicator
device fitted to a Class A, B or C automatic shut-off valve which indicates when the valve is in the nominally closed position

3.2.21
valve proving system
system to check the effective closure of the start gas or main gas safety shut-off valves, and which is capable of detecting small gas leakage rates (e.g. by means of a pressure or vacuum proving system)

3.3 Appliance operation

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 hour (m^3/h), litres per minute (l/min), cubic decimetres per hour (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

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

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

3.3.10
yellow tipping
yellowing of the tip of the blue cone of an aerated flame

3.3.11
first safety time
interval between the ignition burner gas valve, the start gas valve or main gas valve, as applicable, being energized and the ignition burner gas valve, start gas valve or main gas valve, as applicable, being de-energized if the flame detector signals the absence of a flame at the end of this interval

NOTE Where there is no second safety time, this is called the safety time.

3.3.12
second safety time
where there is a first safety time to either a ignition burner or start gas flame only, the interval between the main gas valve being energized and the main gas valve being de-energized if the flame detector signals the absence of a flame

3.3.13
start gas
gas that is supplied at the start gas rate to establish the start gas flame

3.3.14
start gas rate
restricted gas flow rate admitted either to a separate ignition burner or to the main burner during the first safety time

3.3.15
start gas flame
flame established at the start gas rate either at the main burner or at a separate ignition burner

3.3.16
start gas flame proving period
interval between the end of the first safety time and the beginning of the second safety time which is used to prove that the start gas flame is stable

3.3.17
running condition
condition of the system in which the burner is in normal operation under the supervision of the programming unit and its flame detector device

3.3.18
controlled shut-down
process by which the power to the gas shut-off valve(s) is removed immediately, e.g. as a result of the action of a controlling function [EN 298:2003]

3.3.19
safety shut-down
process which is effected immediately following the response of a protection device or a fault in the automatic burner control system and puts the burner out of operation

NOTE The resulting state of the system is defined by deactivatioed terminals for the gas shut-off valves and the ignition device [EN 298:2003].

3.3.20
Lock-out

3.3.20.1
non-volatile lock-out
safety shut-down condition of the system, such that a restart can only be accomplished by a manual reset of the system and by no other means [EN 298:2003]

3.3.20.2
volatile lock-out
safety shut-down condition of the system, such that a restart can only be accomplished by either the manual reset of the system or an interruption of the electrical supply and its subsequent restoration [EN 298:2003]

3.3.21
spark restoration
process by which, after disappearance of the flame signal, the ignition device is energized again without the gas supply having been totally interrupted

NOTE This process ends with the restoration of the running condition or, if there is no flame signal at the end of the safety time, with non-volatile lock-out.

3.3.22
automatic recycling
process by which, after loss of flame during the running condition or accidental interruption of the operation of the appliance, the gas supply is interrupted and the complete start sequence is automatically re-initiated

NOTE This process ends with the restoration of the running condition or, if there is no flame signal at the end of the safety time or, if the cause of the accidental interruption has not been removed, with non-volatile lock-out.

3.3.23
extinction safety time
time interval between extinction of the supervised flame and the gas supply to the main burner and/or to the ignition burner being shut off

3.3.24
no-air condition
condition of the air proving device in which the device is checked for correct operation at zero air flow

3.3.25
proved air flow
minimum air flow at which the air proving device indicates the presence of air flow

3.3.26
safe-start check
check provided by a protective circuit on start up leading to safety shut-down or non-volatile lockout if a fault condition is present

3.4 Gases

3.4.1
test gases
gases intended for the verification of the operational characteristics of appliances using combustible gases. They comprise the reference and the limit gases [EN 437:2003]

3.4.2
reference gases
test gases with which appliances operate under nominal conditions when they are supplied at the corresponding normal pressure [EN 437:2003]

3.4.3
limit gases
test gases representative of the extreme variations in the characteristics of the gases for which appliances have been designed [EN 437:2003]