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Akumulacijski plinski grelniki za pripravo sanitarne tople vode

Gas-fired storage water heaters for the production of domestic hot water

Gasbeheizte Vorrats-Wasserheizer für den sanitären Gebrauch

Appareils de production d'eau chaude par accumulation pour usages sanitaires utilisant les combustibles gazeux

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English version

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This European Standard was approved by CEN on 12 June 1997.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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 Central Secretariat has the same status as the official versions.

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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 48 "Domestic gas-fired water 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of an identical text or by endorsement, at the latest by April 2000, and conflicting national standards shall be withdrawn at the latest by April 2000.

This European Standard 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, which is an integral part of this standard.

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.

It was prepared to deal with aspects relating to :

- safety ;
- rational use of energy ;
- fitness for purpose.

The "normative" annexes are an integral part of the standard. The "informative" annexes are given only for information. In this standard, annexes B, C, E and J are normative and annexes A, D, F, G, H, K, L and ZA are informative.

This standard covers type testing only.

In particular, matters which relate to quality assurance systems, production tests and certification of conformity of auxiliary devices are not dealt with by this standard.

If the manufacturer indicates that the appliance has been tested in accordance with EN 89, the appliance shall conform completely to the requirements of this standard.

Type B₁₁ appliances shall be fitted with a combustion products discharge safety device. In this standard, these appliances are identified as being of type B_{11BS}.

However, appliances intended to be installed : [SIST EN 89:2001](https://standards.iteh.ai/catalog/standards/sist/8120d96c-31a2-409d-a3b1-951a6330c103/sist-en-89-2001)

- either in the open air ;
- or in a room separated from living rooms and provided with appropriate ventilation directly to the outside;

need not have this safety device, but in this case, appropriate warnings on the packaging and in the instructions shall clearly indicate the limit on the use of this type of appliance. In this standard, the appliance is designated as type B₁₁.

In respect of potential adverse effects on the quality of water intended for human consumption, caused by the product covered by this standard :

- a) this standard provides no information as to whether the product may be used without restriction in any of the Member States of the EU or EFTA ;

- b) it should be noted that, while awaiting the adoption of verifiable European criteria, existing national regulations concerning the use and/or the characteristics of this product remain in force.

The following amendments are being prepared and will subsequently supplement EN 89 :

- amendment EN 89 A1 for appliances with burners with a fan ;
- amendment EN 89 prA2 on requirements for combustion products discharge orifice closure devices.

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1 Scope

This European Standard defines the specifications and test methods for the construction, safety, rational use of energy and fitness for purpose, environment and classification and marking of gas-fired storage water heaters for domestic hot water uses, hereafter called "appliance".

This standard applies to appliances :

- of types B₁₁, B_{11BS}, C₁₁, C₂₁ and C₃₁ ;
- fitted with atmospheric burners ;
- using one or more combustible gases corresponding to the three gas families and the pressures indicated in EN 437 ;
- of nominal heat input not exceeding 150 kW (net calorific value) ;
- using or not the water condensation heat in the combustion products ;
- appliances whether subject to the water mains pressure or open-circuit.

This standard does not contain all the requirements necessary for :

- appliances fitted with a fan on the combustion circuit ;
- appliances intended to be connected to a mechanical means of evacuating the combustion products ;
- appliances which fulfill a dual role of space heating and heating water for domestic hot water use ;
- appliances with a combustion products discharge safety device other than that for type B_{11BS} appliances ;
- appliances with electrical combustion products discharge orifice closure device downstream of the heat exchanger fitted to type B appliances and tested as an integral part of the appliance.

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 88, *Pressure governors for gas appliances for inlet pressures up to 200 mbar.*

EN 125, *Specification for flame supervision devices for gas burning appliances - Thermoelectric types.*

EN 126, *Multifunctional controls for gas burning appliances.*

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

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

EN 437, *Test gases, test pressures, appliance categories.*

EN 549, *Rubber materials for seals and diaphragms for gas appliances and equipment.*

EN 60335-1:1988, *Safety of household and similar electrical appliances - Part 1 : General requirements.*

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

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

prEN 1487, *Building valves - Hydraulic Safety groups - Characteristics and tests.*

prEN 1490, *Building valves - Combined temperature and pressure relief valves - Characteristics and tests.*

prEN 50165, *Electrical equipment of non-electric heating appliances for household and similar appliances - Safety requirements.*

ISO 7-1, *Pipe threads where pressure-tight joints are made on the threads - Part 1 : Designation, dimensions and tolerances.*

ISO 228-1, *Pipe threads where pressure-tight joints are not made on the threads - Part 1 : Designation, dimensions and tolerances.*

ISO 262, *ISO general purpose screw threads - Selected sizes for screws, bolts and nuts.*

ISO 274, *Copper tubes of circular section – Dimensions.*

ISO 301, *Zinc alloy ingots intended for casting.*

ISO 3166, *Codes for the representation of names of countries.*

ISO 7005, *Metallic flanges.*

IEC 335-2-14, *Safety of household and similar electrical appliances - Part 2 : Particular requirements for electric kitchen machines.*

IEC 479-1, *Effects of current on human beings and livestock - Part 1 : General aspects.*

IEC 479-2, *Effects of current passing through the human body - Part 2 : Special aspects - Chapter 4: Effects of alternating current with frequencies above 100 Hz - Chapter 5: Effects of special wave forms of current - Chapter 6: Effects of unidirectional single currents of short duration.*

3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply:

3.1 water heater

3.1.1 storage water heater

an appliance which heats and stores a quantity of water contained in a vessel at a pre-set temperature and which has the heating source located inside the vessel

3.1.2 fixed temperature storage water heater

an appliance fitted with a non-adjustable thermostat which controls the water temperature to a given setting

3.1.3 adjustable temperature storage water heater

an appliance fitted with a thermostat controlling the water temperature with the set point value of this device being adjustable between two values, one being the minimum and the other the maximum

3.1.4 open storage water heater

an appliance with a vent to the atmosphere

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3.1.5

closed storage water heater

an appliance which has no vent to the atmosphere

3.1.6

condensing storage water heater

an appliance in which, under normal operating conditions and for certain operation temperatures, the water vapour of the combustion products is partially condensed in order to use the latent heat of this water vapour to produce heat

3.2

characteristics of the gas and electricity supplies

3.2.1

reference conditions

dry gas at a temperature of 15 °C, at an absolute pressure of 1013,25 mbar

3.2.2

test gases

gases intended to check the operational characteristics of the appliances using combustible gases. They comprise reference and limit gases

3.2.2.1

reference gases

the test gases with which appliances operate in normal conditions, when they are supplied at the corresponding normal pressure

3.2.2.2

limit gases

the test gases representative of the extreme variations of the characteristics of the gases for the use of which the appliances have been designed

3.2.3

calorific value

the quantity of heat produced by the complete combustion under reference conditions of unit volume or mass of gas at a constant pressure of 1013,25 mbar, the constituents of the combustible mixture being taken under reference conditions and the products of combustion being brought back to these same conditions

A distinction is made between two types of calorific value :

— gross calorific value : the water produced by combustion is assumed to be condensed ,

Symbol: H_g

— net calorific value : the water produced by combustion is assumed to be in the vapour state.

Symbol: H_n

Units :

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— either megajoules per cubic metre of dry gas taken under reference conditions (MJ/m^3) ;

— or megajoules per kilogram of dry gas (MJ/kg).

Only the net calorific value is used in this standard.

3.2.4

relative density

the ratio of the masses of equal volumes of gas and dry air under reference conditions

Symbol : d

3.2.5

Wobbe number

the ratio of the calorific value of the gas per unit volume to the square root of its relative density, under the same reference conditions. The Wobbe number is said to be gross or net according to whether the calorific value used is the gross or net calorific value

Symbols :

- gross Wobbe number : W_s
- net Wobbe number : W_i

Units :

- either megajoules per cubic metre of dry gas taken under reference conditions (MJ/m^3) ;
- or megajoules per kilogram of dry gas (MJ/kg).

3.2.6

gas pressures

Symbol : p

Unit: millibar (mbar)

NOTE 1 1 mbar = 10^2 Pa.

NOTE 2 A the pressures are static pressures of the moving gas, relative to the atmospheric pressure, measured at right angles to the direction of flow of the gas.

3.2.6.1

test pressures

the gas pressures used to check the operational characteristics of appliances using combustible gases. They include the normal and limit pressures

3.2.6.2

normal pressure

the pressure at which the appliances operate in nominal conditions, when they are supplied with the corresponding reference gas

Symbol : p_n

3.2.6.3

limit pressures

pressures representative of the extreme variations in the appliance supply conditions

Symbols :

- maximum pressure: p_{max}
- minimum pressure: p_{min}

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3.2.6.4

pressure couple

a set of two distinct gas distribution pressures applied because of the big difference that exists between the Wobbe numbers within a single family or group :

- the higher pressure corresponds to the low Wobbe number gases ;
- the lower pressure corresponds to the high Wobbe number gases.

3.2.7

rated voltage

the voltage or range of voltages specified by the manufacturer at which the appliance will operate normally

3.3 composition of the gas circuit

3.3.1 gas circuit

all the parts of the appliance conveying or containing the combustible gas, included between the appliance gas supply connection and the burner(s)

3.3.2 restrictor

a device comprising one or more orifices that is placed in the gas circuit in such a way 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 given rate

3.3.3 injector

a component that admits gas into an atmospheric burner

3.3.4 gas pressure governor

a device that maintains the downstream pressure between fixed limits independent of variations, within a given range, of the upstream pressure and the gas rate

3.3.5 gas volume governor

a device that maintains a rate between fixed limits independent of variations, within a given range, of the upstream and downstream pressures

3.3.6 preset gas rate adjuster

a component allowing the gas rate of the burner to be set to a predetermined value according to the supply conditions. The action of operating this component is called "adjustment of the gas rate"

3.3.7 locking a preset adjuster

immobilization of the preset gas rate adjuster by some means (e.g. by a screw) in a position after adjustment

3.3.8 sealing a preset adjuster

arrangements made to make evident any change to the adjustment, for example: breakage of the device or sealing material

3.3.9 putting a preset adjuster or a control out of service

putting out of operation a preset adjuster or a control (of rate, pressure, etc.) and sealing it in this position. The appliance functions as if this device had been made inoperative

3.4 control and safety devices

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3.4.1 control knob

a component intended to be moved by hand in order to operate an appliance control, for example: tap or temperature selector

3.4.2 manual shut-off valve

a component that permits manual interruption of the gas rate to the burner and ignition burner (if any)

3.4.3 automatic shut-off valve

a valve designed to open when energised by an electrical current and which closes automatically in the absence of the current

**3.4.4
flame supervision device**

a 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

**3.4.5
multifunctional control**

a device having at least two functions, one of which is a shut-off function, integrated in one housing, whereby the functional parts cannot operate if separated

**3.4.6
programming unit**

a device that reacts to impulses from control and safety systems, gives control commands, controls the start-up programme, supervises the burner operation and causes controlled shutdown, safety or lockout if necessary. The programming unit follows a predetermined sequence of actions, in conjunction with the flame detector

**3.4.7
automatic burner control system**

a system that comprises at least a programming unit and all the elements that make up a flame supervision device

**3.4.8
combustion products discharge safety device**

a device that causes at least safety shutdown of the main burner, when an unacceptable spillage of combustion products is detected at the draught diverter of the water heaters (type B_{11BS})

**3.4.9
water overheat safety device**

a device which causes a non-volatile lockout before the water heater can be damaged and the safety of/or the user endangered

**3.4.10
combustion products temperature limiter**

a device in the combustion circuit that causes shut-down with non-volatile lockout when the preset combustion products temperature is reached

**3.4.11
vent**

an orifice which permits atmospheric pressure to be maintained in a compartment of variable volume

**3.5
stages of operational and safety sequence**

**3.5.1
program**

the sequence of the operations determined by the programming unit to assure the start-up, supervision and shutdown of the burner

**3.5.2
spark restoration**

the automatic process by which, following disappearance of the flame signal, the ignition device is switched on again without the gas supply having been interrupted

**3.5.3
recycling**

the automatic process by which, after loss of flame at steady state, the gas supply is interrupted and the full start procedure is re-initiated automatically

**3.5.4
controlled shutdown**

the process by which a control device (internal or external to the appliance) immediately cuts off the gas supply to the burner; the appliance returns to its start position

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3.5.5

safety shutdown

the process which is initiated immediately in response to the signal from a temperature limiting device or sensor and which causes the burner to shut down. The appliance returns to its start position

3.5.6

locking out

interruption of the complete gas supply, with lockout

3.5.7

non-volatile lockout

a situation such that a restart can only be accomplished by a manual reset

3.5.8

volatile lockout

a situation such that a restart can only be accomplished either by manual intervention or by restoration of the electrical supply after its loss

3.5.9

ignition lockout (thermoelectric device only)

a device that prevents the ignition system from functioning for as long as the main gas circuit is open

3.5.10

restart lockout (thermoelectric device only)

a device that prevents restoration of the gas flow to the main burner or to the main burner and the ignition burner until the end of the extinction delay time

3.6

burners and ignition devices

3.6.1

burner

a component that provides the air-gas mixture and ensures the combustion of the gas

3.6.2

main burner

a burner that is intended to assure the thermal function of the appliance and is generally called "the burner"

3.6.3

ignition device

any means (flame, electrical ignition device or other device) used to ignite the gas admitted to the ignition burner or the main burner

3.6.3.1

manual ignition device

a device by means of which the burner is ignited following manual intervention

3.6.3.2

automatic ignition device

an automatic device which ignites the ignition burner or the main burner directly

3.6.4

ignition burner

a burner intended to ignite a main burner. Those recognized are respectively

- a) permanent ignition burner: An ignition burner that operates continuously throughout the whole period that the appliance is in use ;
- b) intermittent ignition burner: An ignition burner that is ignited before and extinguished at the same time as the main burner ;
- c) alternating ignition burner: An ignition burner that is extinguished as soon as ignition of the main burner is effected. It re-ignites at the main burner flame just before the latter goes out ;

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