SLOVENSKI STANDARD
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Akumulacijski plinski grelniki vode 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

Ta slovenski standard je istoveten z: **EN 89:2015**

ICS:

91.140.65	Oprema za ogrevanje vode	Water heating equipment
97.100.20	Plinski grelniki	Gas heaters

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English Version

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

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

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN 89:2015) 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of an identical text or by endorsement, at the latest by November 2015 and conflicting national standards shall be withdrawn at the latest by November 2015.

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This document supersedes EN 89:1999.

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For relationship with EU Directive(s), see informative Annex ZA, Annex ZB or Annex ZC, which are integral parts of this document.

The present standard deals with:

— safety;

— rational use of energy;

— fitness for purpose.

It gives specific requirements relative to:

— appliances with burners with a fan;

— combustion products discharge orifice closure devices;

— type C water heaters with a fan incorporated in the combustion air supply circuit or in the combustion products evacuation circuit;

— condensing water heaters;

— measurement of NO_x emissions of water heaters;

— the metallic, plastic and other non-metallic materials that are used in water heaters and which come into contact with water intended for human consumption. It is intended to ensure that products of this kind complying with these requirements meet current technological development and requirements with regard to the service life of the water heaters and their physiological suitability;

— the growth of microorganism on materials in contact with drinking water.

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, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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 European Standard applies to appliances:

— of selected types B_1, B_2, B_3, B_5, C_1, C_2, C_3, C_4, C_5, C_6, C_7, C_8, C_9 according to CEN/TR 1749;

— 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);

— fitted with electrically operated mechanical flue dampers that are positioned downstream of the heat exchanger.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 88-1:2011, *Pressure regulators and associated safety devices for gas appliances — Part 1: Pressure regulators for inlet pressures up to and including 50 kPa*

EN 125, *Flame supervision devices for gas burning appliances — Thermoelectric flame supervision devices*

EN 126, *Multifunctional controls for gas burning appliances*

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

EN 298:2012, *Automatic burner control systems for burners and appliances burning gaseous or liquid fuels*

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

EN 513, *Unplasticized polyvinylchloride (PVC-U) profiles for the fabrication of windows and doors — Determination of the resistance to artificial weathering*

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

EN 573-1, *Aluminium and aluminium alloys — Chemical composition and form of wrought products — Part 1: Numerical designation system*

EN 1057, *Copper and copper alloys — Seamless, round copper tubes for water and gas in sanitary and heating applications*

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

EN 1490, *Building valves — Combined temperature and pressure relief valves — Tests and requirements*

CEN/TR 1749 *European scheme for the classification of gas appliances according to the method of evacuation of the combustion products (types)*

EN 1856-1:2009, *Chimneys — Requirements for metal chimneys — Part 1: System chimney products*

EN 10088-1, *Stainless steels — Part 1: List of stainless steels*

EN 10226-1, *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 13203-1, *Gas-fired domestic appliances producing hot water — Appliances not exceding 70 kW heat input and 300 l water storage capacity — Part 1: Assessment of performance of hot water deliveries*

EN 13203-2, *Gas-fired domestic appliances producing hot water — Appliances not exceeding 70 kW heat input and 300 l water storage capacity — Part 2: Assessment of energy consumption*

EN 13216-1, *Chimneys — Test methods for system chimneys — Part 1: General test methods*

EN 13501-1, *Fire classification of construction products and building elements — Part 1: Classification using data from reaction to fire tests*

EN 13611:2007+A2:2011, *Safety and control devices for gas burners and gas burning appliances — General requirements*

EN 14241-1:2013, *Chimneys — Elastomeric seals and elastomeric sealants — Material requirements and test methods — Part 1: Seals in flue liners*

EN 14459, *Control functions in electronic systems for gas burners and gas burning appliances — Methods for classification and assessment*

EN 14471:2013, *Chimneys — System chimneys with plastic flue liners — Requirements and test methods*

EN 60335-1:2012, *Household and similar electrical appliances — Safety — Part 1: General requirements (IEC 60335-1:2010)*

EN 60335-2-102, *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)*

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

EN ISO 178, *Plastics — Determination of flexural properties (ISO 178)*

EN ISO 179-1, *Plastics — Determination of Charpy impact properties — Part 1: Non-instrumented impact test (ISO 179-1)*

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

EN ISO 527-1, *Plastics — Determination of tensile properties — Part 1: General principles (ISO 527-1)*

EN ISO 527-2, *Plastics — Determination of tensile properties — Part 2: Test conditions for moulding and extrusion plastics (ISO 527-2)*

EN ISO 1183 (all parts), *Plastics — Methods for determining the density of non-cellular plastics (ISO 1183)*

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

EN ISO 9969, *Thermoplastics pipes — Determination of ring stiffness (ISO 9969)*

ISO 37, *Rubber, vulcanized or thermoplastic — Determination of tensile stress-strain properties*

ISO 188, *Rubber, vulcanized or thermoplastic — Accelerated ageing and heat resistance tests*

ISO 262, *ISO general purpose metric screw threads — Selected sizes for screws, bolts and nuts*

ISO 301, *Zinc alloy ingots intended for castings*

ISO 815-1, *Rubber, vulcanized or thermoplastic — Determination of compression set — Part 1: At ambient or elevated temperatures*

ISO 1817, *Rubber, vulcanized or thermoplastic — Determination of the effect of liquids*

ISO 2781, *Rubber, vulcanized or thermoplastic — Determination of density*

ISO 6914, *Rubber, vulcanized or thermoplastic — Determination of ageing characteristics by measurement of stress relaxation in tension*

ISO 7005, *Pipe flanges*

ISO 7619, *Rubber — Determination of indentation hardness by means of pocket hardness meters*

3 Terms and definitions

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

3.1
water heater
3.1.1
storage water heater
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
appliance fitted with a non-adjustable thermostat which controls the water temperature to a given setting

3.1.3
adjustable temperature storage water heater
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
appliance with a vent to the atmosphere

3.1.5
closed storage water heater
appliance which has no vent to the atmosphere

3.1.6
condensing storage water heater
appliance in which under normal operating conditions and for normal inlet water temperatures the water vapour of the combustion products is partially condensed in order to use the latent heat of this water vapour to produce hot water

3.2
characteristics of the gas and electricity supplies
3.2.1
reference condition
these correspond to 15 °C, 1 013, 25 mbar, unless otherwise specified

[SOURCE: EN 437:2003+A1:2009, 3.9]

3.2.2
test gas
gases intended for the verification of the operational characteristics of gas appliances. They consist of reference gases and limit gases

[SOURCE: EN 437:2003+A1:2009, 3.2]

3.2.2.1
reference gas
test gases with which appliances operate under nominal conditions when they are supplied at the corresponding normal pressure

[SOURCE: EN 437:2003+A1:2009, 3.3]

3.2.2.2
limit gases
test gases representative of the extreme variations in the characteristics of the gases for which appliances have been designed

[SOURCE: EN 437:2003+A1:2009, 3.4]

3.2.3
calorific value
quantity of heat produced by the complete combustion, at a constant pressure equal to 1 013,25 mbar, of a unit volume or mass of gas, the constituents of the combustible mixture being taken at reference conditions and the products of combustion being brought back to the same conditions

A distinction is made between:

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

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

Note 1 to entry: The calorific value is expressed:

— either in megajoules per cubic metre (MJ/m3) of dry gas under the reference conditions;

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

[SOURCE: EN 437:2003+A1:2009, 3.11]

3.2.4
relative density
d
ratio of the masses of equal volumes of dry gas and dry air under the same conditions of temperature and pressure: 15 °C or 0 °C and 1 013, 25 mbar

[SOURCE: EN 437:2003+A1:2009, 3.10]

3.2.5
Wobbe number
gross Wobbe index W_s; net Wobbe index W_i

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

Note 1 to entry: The Wobbe indices are expressed:

— either in megajoules per cubic metre (MJ/m3) of dry gas under the reference conditions

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

[SOURCE: EN 437:2003+A1:2009, 3.12, modified]

3.2.6
gas pressure
p

Note 1 to entry: Unit: millibar (mbar).

Note 2 to entry: 1 mbar = 10^2 Pa.

Note 3 to entry: 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 pressure
gas pressures used to verify the operational characteristics of gas appliances. They consist of normal and limit pressures

Note 1 to entry: The gas pressures used are expressed in millibars (mbar) 1 mbar = 10^2 Pa.

[SOURCE: EN 437:2003+A1:2009, 3.5]

3.2.6.2
normal pressure
p_n
pressure under which the appliances operate in nominal conditions when they are supplied with the corresponding reference gas

[SOURCE: EN 437:2003+A1:2009, 3.6]

3.2.6.3
limit pressure
maximum pressure: p_{max}; minimum pressure: p_{min} pressures representative of the extreme variations in the appliance supply conditions

[SOURCE: EN 437:2003+A1:2009, 3.7]

3.2.6.4
pressure couple
combination of two distinct gas distribution pressures applied by reason of the significant difference existing between the Wobbe indices within a single family or group in which

— the highest pressure corresponds only to the low Wobbe index;

— the lowest pressure corresponds to the high Wobbe index

[SOURCE: EN 437:2003+A1:2009, 3.8]

3.2.7
rated voltage
voltage or range of voltages 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
device (with one or more orifices, if any) which is placed in the gas circuit so as to create a pressure drop and thus bring the gas pressure at the burner to a predetermined value for a given supply pressure and given rate

3.3.3
injector
component that admits gas into an atmospheric burner

3.3.4
gas pressure governor
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
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
component allowing the gas rate of the burner to be set to a predetermined value according to the supply conditions

Note 1 to entry: 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

EXAMPLE Breakage of the device or sealing material.