SLOVENSKI STANDARD

SIST EN 449:2004

01-januar-2004

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Specifikacije za plinske aparate na utekoļ injeni naftni plin - Plinski grelniki za ogrevanje prostorov brez priključļ ka na dimnik (vključļ no z grelniki z difuzijskim katalitskim zgorevanjem)

Specification for dedicated liquefied petroleum gas appliances - Domestic flueless space heaters (including diffusive catalytic combustion heaters)

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Festlegungen für Flüssiggasgeräte - Abzuglose Haushaltsraumheizgeräte (einschließlich Heizgeräte mit diffusiver katalytischer Verbrennung)

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Spécifications pour les appareils fonctionnant exclusivement aux gaz de pétrole liquéfiés - Appareils de chauffage domestiques non raccordés (y compris les appareils de chauffage a combustion catalytique diffusive)

Ta slovenski standard je istoveten z: **EN 449:2002**

ICS:

97.100.20	Plinski grelniki	Gas heaters

SIST EN 449:2004 **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

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EN 449

November 2002

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Supersedes EN 449:1996

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Specification for dedicated liquefied petroleum gas appliances - Domestic flueless space heaters (including diffusive catalytic combustion heaters)

Spécifications pour les appareils fonctionnant exclusivement aux gaz de pétrole liquéfiés - Appareils de chauffage domestiques non raccordés (y compris les appareils de chauffage à combustion catalytique diffusive)

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This European Standard was approved by CEN on 9 September 2002.

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 Management Centre or to any CEN member.

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Foreword

This document (EN 449:2002) has been prepared by Technical Committee CEN/TC 181 "Dedicated liquefied petroleum gas appliances", 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 May 2003, and conflicting national standards shall be withdrawn at the latest by May 2003.

This document supersedes EN 449:1996.

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, which is an integral part of this document.

This standard cancels and replaces EN 449:1996. Relating to the 1996 version, this standard introduces technical modifications in particular on marking requirements, construction requirements, flow rate requirements, and several test methods of which life test for catalytic combustion appliances.

Items relating to quality assurance systems, production testing and particularly certificates of conformity of auxiliary equipment are not covered by this standard.

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Annexes A and B are normative elements of this standard. Annex C is informative.

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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, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard specifies the requirements, the test methods and the marking of domestic flueless space heaters, including diffusive catalytic combustion heaters, having a nominal heat input (H_S), not exceeding 4,2 kW burning 3rd family gases at nominal operating pressures not exceeding 50 mbar, referred to in the text as 'appliances'.

This European Standard is applicable to the following types of appliances:

a) fixed heaters burning commercial butane and/or commercial propane;

b) portable or mobile heaters burning either commercial butane, or, commercial butane and commercial propane including those that incorporate a LPG container installation compartment for a transportable refillable liquefied petroleum LPG container.

There are no specific thermal efficiency requirements appropriate to these types of appliance as:

c) all the heat produced by the combustion process is released into the space to be heated;

d) the requirements with regard to the combustion performance, which is a safety matter, ensure the effective burning of the fuel gas.

It does not cover appliances incorporating electrically operated gas control systems.

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Annex A gives the details of the categories of appliances marketed in various countries.

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Requirements for appliances given in this standard assume that the supply of gas from the container will be governed by a pressure regulator having a maximum nominal outlet pressure of 50 mbar.

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This European Standard does not cover LPG containers for liquefied petroleum gas neither their associated regulator nor tubing and flexible hoses which shall comply with national requirements in force.

This European Standard only covers type testing.

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 (including amendments).

EN 125, *Flame supervision devices for gas burning appliances - Thermo-electric flame supervision devices*.

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

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

EN 257, *Mechanical thermostats for gas burning appliances*.

EN 437:1993, *Test gases - Test pressures - Appliance categories*.

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

EN 751-1, *Sealing materials for metallic threaded joints in contact with 1st, 2nd and 3rd family gases and hot water - Part 1: Anaerobic jointing compounds.*

EN 751-2, *Sealing materials for metallic threaded joints in contact with 1st, 2nd and 3rd family gases and hot water - Part 2: Non-hardening jointing compounds.*

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

EN 60335-1:1994, *Safety of household and similar electrical appliances - Part 1: General requirements (IEC 60335-1:1991, modified)*.

EN ISO 3166-1, *Codes for the representation of names of countries and their subdivisions - Part 1: Country codes (ISO 3166-1:1997)*.

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

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

CR 1472:1997, *General guidance for the marking of gas appliances*.

CR 1749, *European scheme for the classification of gas appliances according to the method of evacuation of the products of combustion (Types).*

3 Terms and definitions

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

3.1
appliance incorporating a LPG container
appliance which includes a LPG container installation compartment

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3.2
auxiliary equipment

- tap and cocks;
- flame supervision devices;
- thermostats;
- multifunctional controls;
- automatic shut-off valves.

3.3
burner
component that allows the gas to burn.

Two types are distinguished:

- non-aerated burner: in which the air for combustion is entrained entirely at the burner outlet or at the burner surface for catalytic burners;
- aerated burner in which part of the air for combustion, termed primary air, is entrained by the gas flow and mixed before the burner outlet. The remainder of the air drawn in at the port, termed secondary air, is drawn in after the burner outlet or at the burner surface for catalytic burners

3.4
heat input
quantity of energy used divided by time corresponding to the volumetric or mass flow rates, the calorific value used being either the net or gross calorific value

NOTE Q

Unit : kilowatt (kW)

[EN 437:1993]

3.5
nominal heat input
value of the heat input declared by the manufacturer

NOTE Q_n

[EN 437:1993]

3.6
volume rate
volume of gas consumed by the appliance during continuous operation divided by the operating time.

NOTE V

Units: cubic metre per hour (m^3/h), litre per min (l/min), cubic decimetre per hour (dm^3/h) or cubic decimetre per second (dm^3/s)

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[EN 437:1993]

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3.7
mass rate
mass of gas consumed by the appliance during continuous operation divided by the operating time

NOTE M

Units : kilogram per hour (kg/h), or gram per hour (g/h)

[EN 437:1993]

3.8
flame lift
phenomenon characterized by the partial or total movement of the base of the flame away from the burner port

3.9
relative density
ratio of the masses of equal volumes of dry gas and dry air at the same conditions of temperature and pressure : 15°°C (or 0°°C), 1 013, 25 mbar

NOTE d

[EN 437:1993]

3.10
ignition device
device to ignite one or more burners directly or indirectly, for instance through a flash tube
it may be either electric (resistance, spark, etc.) or thermal (pilot, etc.)

3.11
flame supervision device
device including a sensing element which causes the gas supply to a burner to be opened or closed according to the presence or absence of the flame which activates the sensing element

3.12
Wobbe number
ratio of the calorific value of a gas per unit volume 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 gross Wobbe index : W_S ; net Wobbe index : W_i.

Units: either

— megajoule per cubic metre (MJ/m^3) of dry gas at the reference conditions, or

— megajoule per kilogram (MJ/kg) of dry gas

[EN 437:1993]

3.13
injector
component part that admits the gas into an aerated burner. There are two types of injectors:

— calibrated injector: where the section of the outlet orifice is fixed ;

— adjustable injector: where the section of the outlet orifice is variable

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3.14
sound mechanical joint
connection device assuring soundness in an assembly made up of several parts, generally of metal

it can be:

— a conical joint;

— an O-ring joint;

— a flat-faced joint.

3.15
tap handle
manually operated component used to open, partially open, or close a tap

3.16
primary air adjuster
device allowing the primary aeration of a burner to be set at a predetermined value according to the supply conditions. The operation of changing the setting of this device is termed the 'adjustment of primary air'

3.17
gas rate adjuster
device allowing the gas rate to a burner to be set at a predetermined value according to the supply conditions. It often consists of a screw, termed a 'throttle screw' or an 'adjustment screw'. The operation of changing the setting of this device is termed the 'adjustment of the gas rate'

3.18
gross calorific value H_S
quantity of heat produced by the complete combustion, at constant pressure, of unit volume or mass of the considered gas, the water produced by the combustion being condensed.

It is expressed in megajoules referred either to per cubic meter of dry gas measured at 15°°C at a pressure of 1 013,25 mbar or to per kg of dry gas

3.19
gas supply pressure
difference between the static pressure measured at the inlet connection of the appliance and the atmospheric pressure

3.20
light back
phenomenon characterized by the return of the flame inside the body of the burner

3.21
tap
device to adjust the heat input during use and/or isolate the gas supply to the various burners

3.22
soft solder
solder for which the lowest temperature of the melting range, after application, is less than 450 °C

3.23
stability of flames
conditions of the flames at the burner ports when the phenomena of flame lift or light back do not occur

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3.24
thermostat
device to maintain automatically a selected constant temperature. It may include a graduated scale for the selection of the temperature

3.25
closed fronted fire
appliance in which the glowing area is substantially covered by means of a transparent or translucent screen

3.26
cold condition
condition of the appliance required for some tests and obtained by allowing the unlit appliance to attain equilibrium at room temperature

3.27
hot condition
condition of the appliance required for some tests and obtained by heating for one hour at the normal test pressure

3.28
fixed heater
heater designed to be secured to a wall or floor

3.29
mobile heater
self-contained heater incorporating its own gas container within the body of the appliance and designed to be moved without lifting

3.30
portable appliance
self-contained heater for connection to a gas supply by means of flexible tubing and designed to be easily carried

3.31
atmosphere sensing device
a device that is designed to shut off the gas supply when the carbon dioxide concentration of the surrounding atmosphere exceeds a given level. Such a device normally comprises a vitiation sensitive pilot in conjunction with a suitable flame supervision device

3.32
catalytic unit
panel and its content, including the catalytic pad, into which the gas is injected, through which it is distributed and oxidised, and from which the products are emitted

3.33
diffusive catalytic combustion space heater
space heating appliance in which gas diffuses through a catalytic pad and is flamelessly oxidized by oxygen that has diffused into the pad from the surrounding atmosphere at a temperature below that at which flame combustion would occur

NOTE Diffusive catalytic combustion space heaters do not include catalytic combustion heaters in which pre-mixing of gas and air is effected before the catalytic pad is reached, nor do they include appliances employing after-burners in which products of incomplete combustion from burners are further oxidized over a catalyst.

3.34
by-pass rate
non-adjustable rate of flow through a thermostat when the valve is closed

3.35
slip
ratio of unburnt fuel gas to total hydrocarbons which have passed through the catalytic pad

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3.36
minimum operational rate

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either

a) for any burner or section of a burner that is controlled by a thermostat, the bypass rate; or

b) for any burner that is manually controlled but where it is only possible to obtain certain predetermined fixed settings, the lowest rate obtainable in normal use

3.37
removable
that which may only be removed with a tool

3.38
direct destination country
country for which the appliance has been certified and which is specified by the manufacturer as the intended country of destination

[CR 1472:1997]

3.39
manufacturer
person responsible for designing and manufacturing a product covered by the directive, with a view to placing it on the Community market on his own behalf

[CR 1472:1997]

4 Classification

4.1 Classification of gases

Gases likely to be used are classified in families according to the value of their Wobbe number. Table 1 details the family and groups relevant for this standard.

Table 1 — Classification of gases

Gas families and groups 3rd Family Gases	Wobbe Number MJ/m^3 (H_S at 15 ^{O}C)
Group B/P	between 72,9 and 87,3
Group P	between 72,9 and 76,8
Group B	between 81,8 and 87,3

4.2 Classification of appliances according to the supply gases and pressures

Appliances are classified into categories according to the gases and pressures that they are designed to use. However, for each country, only some of the categories defined hereafter are applicable, on account of local gas distribution conditions (types of gas and supply pressures). For these categories, requirements different from those defined in this standard shall not be specified.

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Annex A describes the gas distribution conditions and types of connection applicable to each country.

This specification only covers appliances of the following categories:

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a) appliances in Category I_{3+} which may be used at a nominal operating pressure of 37 mbar when used on propane and a nominal operating pressure of 28 mbar or 30 mbar when used on butane;

b) appliances in Category $I_{3B/P(30)}$ which may be used with propane, butane or mixes of these gases at a nominal operating pressure of 28 mbar or 30 mbar;

c) appliances in Category $I_{3B/P(50)}$ which may be used with propane, butane or mixes of these gases at a nominal operating pressure of 50 mbar;

d) appliances in Category I_{3B} which may be used with butane only at a nominal operating pressures of 28 mbar or 30 mbar;

e) appliances in Category $I_{3P(37)}$ which may be used with propane only at a nominal operating pressure of 37 mbar;

f) appliances in Category $I_{3P(50)}$ which may be used with propane only at a nominal operating pressure of 50 mbar.

4.3 Classification of appliances according to the method of evacuation of products of combustion

According to the classification given in CR 1749, the appliances falling into the scope of this standard are of type A_{1AS}, that is to say "appliances not intended for connection to a flue or to a device for evacuating the products of combustion to the outside of the room in which the appliance is installed, not fitted with a fan, but fitted with an atmosphere sensing device" (see 5.13.2).

5 Safety and constructional requirements

5.1 Test methods

The test methods and means of assessment shall be as described in clause 6.

5.2 Conversion to different gases

The appliance shall be supplied for a single gas category and for a single operating pressure or pressure couple. Conversion to another category or pressure or pressure couple is not permitted.

5.3 Materials

The quality and thickness of material used in the construction of an appliance shall be such that the safety characteristics are not altered in use.

In particular, all parts of the appliance shall withstand the mechanical, chemical and thermal conditions to which they may be submitted during their use. In normal conditions of use, of cleaning or of adjustment, the materials shall not be liable to any deformation which might impair their performance. Metal parts shall be suitably protected against the effects of corrosion.

When a European Standard is adopted for a means of sealing used on the appliance, that means of sealing shall comply with the requirements of that European Standard.

Rubber seals shall be made from materials which comply with EN 549.

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The appliance gas pipework and gas controls shall be of metal except as allowed in 5.6.

Materials containing asbestos shall not be used.

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Glass components shall not have sharp edges or corners likely to cause injury during use or maintenance. Mountings for glass components shall be such as to avoid stresses on the glass during normal use.

5.4 Cleaning and user maintenance

Any part of the appliance requiring cleaning by the user shall be easily accessible without having to move the appliance, and without the use of a tool. It shall be possible to replace such parts correctly and without difficulty.

Appliances shall have no ragged or sharp edges other than those necessary for the function of the appliance or accessory that could create an hazard for the user in normal use or during user maintenance.

The assembly of the LPG container by the user shall be possible with simple, commonly available, tools. If a special tool is required it shall be provided with the appliance by the manufacturer.

5.5 Strength of assembly

The construction of the appliance shall be such that, during normal conditions of use, maintenance and, for mobile and portable appliances, movement, any displacement, distortion or deterioration of parts likely to impair its good performance will not occur.

For mobile and portable heaters connected using a downward facing union connector (5.7.1 b2), at the end of the test carried out according to 6.5 a), the soundness of the gas circuit shall be checked according to 5.6.

5.6 Soundness of the gas circuit assembly

All gas carrying parts, starting with the inlet connection, shall be delivered by the manufacturer assembled for operation.

Holes for screws, pins, etc. intended for the assembly of components shall not open into the gas ways.

The soundness of assemblies connected to the gas circuit shall be assured, by means of mechanical seal joints.

For parts that do not require to be dismantled during normal maintenance, for example taps and injectors, the use of appropriate thread sealing compounds is permitted, those compounds shall comply with EN 751-1 and EN 751-2.

Soft solder shall not be used to ensure the soundness of the connections of the gas circuit. Removable components or the threaded parts of the pipe work which may be dismantled during normal maintenance shall remain sound after five disconnection's, if necessary after changing a gasket, where such exists.

Under the test condition specified in 6.6.2, the leak detected during each of the tests numbers 1 and 2 shall not exceed 0,07 dm^3/h (dry air, 20 °C, 1 013,25 mbar).

5.7 Connections

5.7.1 Gas inlet

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The gas inlet to the appliance shall be one of the following types:

a) for fixed appliances:

1) without a thread: for a length of at least 30 mm its extremity shall be cylindrical, smooth and clean to allow connection by means of a gas-tight compression fitting;

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2) with a thread: its extremity shall have a thread following ISO 228-1 or ISO 7-1, size 1/2, 3/8, 1/4 (major diameter 21 mm, 17 mm or 13 mm);

3) for connection to copper tube complying with EN 1057 (compression or capilliary fittings);

b) for mobile and portable appliances:

1) with a nozzle for the attachment of a flexible tube;

2) a downward facing union connector for a hose assembly.

The Special National Conditions with regard to connections are given in annex A.

5.7.2 Pressure test point

For fixed appliances, means shall be provided to allow the pressure to be measured easily.

The pressure test point in the gas circuit, if exists, shall have a nozzle with an external diameter of $(9^{0}_{-0,5})$ mm and shall be at least 10 mm long. The internal diameter shall not exceed 1 mm.

5.7.3 Connection with flexible houses having a threaded extremity

The housing assembly shall be designed such as to resist to the tests described in 6.5 a).

5.8 Appliance stability, fixing and mobility devices

5.8.1 Appliances with integral containers

The appliance shall be so designed that, with its container in place, it cannot be tipped over when subjected to the force and the test conditions specified in 6.8.1.

5.8.2 Appliances without integral containers

When tested in accordance with 6.8.2 the appliance shall not fall forwards or sideways when placed on an inclined plane at an angle of 15°. It shall not fall backwards when placed on an inclined plane at an angle of 10°.

5.8.3 Fixed appliances

When the appliance is installed as described in the manufacturer's instructions, it shall be secure.

In the test conditions described in 6.8.3, the appliance shall remain securely fixed to the wall and the mounting shall not be distorted.

5.8.4 Mobility devices

After the test described in 6.8.4, there shall be no damage to the wheels or castors, and they shall rotate freely.

5.9 Taps and controls

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5.9.1 General

The appliance shall be fitted with such taps and controls as are essential for the normal operation of the appliance by the user.

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When a European Standard is adopted for any item of auxiliary equipment as defined in 3.2, that equipment shall comply with the requirements of that European Standard.

When a flame supervision device, multi-functional control, automatic shut-off valve, or thermostat falls within the scope of EN 125, EN 126, EN 161 or EN 257, the requirements of that standard shall be met.

Mobile and portable appliances shall not incorporate a position on the tap capable of completely closing the gas supply.

Catalytic appliances which employ a flame for ignition shall be so constructed that after the pre-heat period it is not possible to select a pre-heat position without continuous manual operation.

Taps shall be placed in such a way that their strength, operation, manipulation and accessibility undergo no damage from actions to which they are subjected in normal use, and they shall be protected against ingress of foreign matter.

Moreover, their manipulation shall remain easy during and after the test described in 6.23.2.

All parts of a control shall be clean.

Taps shall be mounted in such a way that no accidental movement relative to the gas supply connection is possible.

Any control placed in the gas circuit shall be arranged so that any maintenance by a service engineer is easy and so that its exchange by a service engineer is possible.