SLOVENSKI STANDARD

SIST EN 449

prva izdaja
december 1997

Specifikacije za plinske aparate na utekočinjen naftni plin - Plinski grelniki za ogrevanje prostorov brez priključka na dimnik (vključno z grelniki z difuzijskim katalitskim zgorevanjem) (prevzet EN 449:1996 z metodo platnice)

Specifications 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)

Festlegungen für Flüssiggasgeräte - Abzugslose Haushaltsraumheizer (einschließlich Heizer mit diffusiver katalytischer Verbrennung)

Deskriptorji: grelniki, plinski aparati, utekočinjeni naftni plini, definicija, razvrstitev, značilnosti, varnost, preskušanje, označevanje, tehnične opombe

ICS 21.140;23.040.70;91.140.20

Referenčna številka
SIST EN 449:1997 ((sl),en)

Nadaljevanje na straneh od II do III in 1 do 69

UVOD

Standard SIST EN 449, Specifikacije za plinske aparate na utekočinjen naftni plin - Plinski grelniki za ogrevanje prostorov brez priključka na dimnik (vključno z grelniki z difuzijskim katalitskim zgorevanjem), prva izdaja, 1997, ima status slovenskega standarda in je z metodo platnice prevzet evropski standard EN 449, Specifications for dedicated liquefied petroleum gas appliances - Domestic flueless space heaters (including diffusive catalytic combustion heaters), 1996-02, v angleškem jeziku.

NACIONALNI PREDGOVOR

Evropski standard EN 449:1996 je pripravil tehnični odbor Evropskega komiteja za standardizacijo CEN/TC 181 Dedicated liquefied petroleum gas appliances (Plinski aparati na utekočinjen naftni plin).

Pripravo tega standarda sta CEN poverila Evropska komisija in Evropsko združenje za prosto trgovino. Ta evropski standard ustreza bistvenim zahtevam evropske direktive 90/396/EEC.

Odločitev za prevzem evropskega standarda EN 449:1996 po metodi platnice je dne 1996-09-25 sprejel tehnični odbor USM/TC PLN Plinske naprave za dom.

Ta slovenski standard je dne 1997-12-05 odobril direktor USM

NACIONALNI DODATEK

Naslednje tabele iz dodatka A se dopolnijo s parametri, ki veljajo v Sloveniji:

Stran 59 - tabela A.1: Običajni priključni tlaki za aparate

V Sloveniji se uporablja nazivni tlak 30 mbar.

Stran 60 - tabela A.2: Kategorije aparatov, ki se prodajajo v posameznih državah

V Sloveniji se uporabljata kategoriji aparatov: I_{3+} in $I_{3B/P(30)}$.

Stran 61 - tabela A.3: Vrste priključkov, ki se uporabljajo v posameznih državah

Za vse kategorije aparatov se uporabljajo navojni priključki, definirani v mednarodnih standardih ISO 7-1 in ISO 228-1, za aparate, ki vsebujejo prostor za plinsko jeklenko, pa tudi priključek na sliki A.2 (stran 63).

ZVEZE S STANDARDI

S prevzemom tega evropskega standarda veljajo poleg standardov, navedenih v izvirniku, še naslednje zveze:

SIST EN 125:1997 (en)	Naprave za nadzor plamena pri plinskih aparatih - Termoelektrična varovala
SIST EN 125/A1:1997 (en)	Naprave za nadzor plamena pri plinskih aparatih - Termoelektrična varovala - Dodatek A.1
SIST EN 126:1997 (en)	Večnamenski krmilniki za plinske aparate
SIST EN 161:1997 (en)	Samodejni zaporni ventili za plinske gorilnike in plinske aparate

SIST EN 161/A1:1997 (en)	Samodejni zaporni ventili za plinske gorilnike in plinske aparate - Dodatek A.1
SIST EN 257:1997 (en)	Mehanski termostati za plinske aparate
SIST EN 257/A1:1997 (en)	Mehanski termostati za plinske aparate - Dodatek A.1
SIST EN 549:1996 (en)	Gumeni materiali za tesnila in membrane v plinskih aparatih in plinskih napravah
SIST EN 60335-1:1995 (en)	ni prevoda naslova
SIST ISO 7-1:1995 (en)	Cevni navoji, pri katerih je tesnjenje izvedeno z navojem - 1. del: Mere, tolerance in označevanje
SIST ISO 228-1:1995 (en)	Cevni navoji, pri katerih tesnjenje ni izvedeno z navojem - 1. del: Mere, tolerance in označevanje

OSNOVA ZA IZDAJO STANDARDA

- Prevzem standarda EN 449:1996

OPOMBI

- Povsod, kjer se v besedilu standarda uporablja izraz "evropski standard", v SIST EN 449:1997 to pomeni "slovenski standard".
- Uvod in nacionalni predgovor nista sestavni del standarda.

Po mnenju Ministrstva za informiranje Republike Slovenije z dne 18. februarja 1992, štev. 23/96-92, spada ta publikacija med proizvode informativne narave iz 13. točke tarifne številke 3, za katere se plačuje 5-odstotni prometni davek.

EUROPEAN STANDARD **EN 449**

NORME EUROPÉENNE

EUROPÄISCHE NORM February 1996

ICS 21.140; 23.040.70; 91.140.20

Descriptors: heaters, household appliances, gas appliances, liquefied petroleum gases, definition, classifications, characteristics, safety, tests, marking, technical notices

English version

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 a combustion catalytique diffusive)

Festlegungen für Flüssiggasgeräte - Abzugslose Haushaltsraumheizer (einschließlich Heizer mit diffusiver katalytischer Verbrennung)

This European Standard was approved by CEN on 1995-07-19. 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.

The European Standards exist 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.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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

Contents

		Page
	Foreword	6
1	Scope	7
2	Normative references	7
3	Definitions	9
4	Classification	13
4.1	Classification of gases	13
4.1	Classification of appliances	13
5	Safety and constructional requirements	14
5.1	Test methods	14
5.2	Conversion to different gases	14
5.3	Materials	14
5.4	Cleaning and user maintenance	15
5.5	Strength of assembly	15
5.6	Soundness of the gas circuit assembly	15
5.7	Connections	16
5.8	Appliance stability, fixing and mobility devices	16
5.9	Taps and controls	17
5.10	Control handles, knobs or pushbuttons	18
5.11	Injectors	19
5.12	Ignition devices	19
5.13	Safety devices	19
5.14	Cylinder compartment	20
5.15	Verification of heat inputs	21
5.16	Effect of light back	21
5.17	Temperature of various parts of the appliance	22
5.18	Temperature of the support, walls or adjacent surfaces	22
5.19	Temperature of taps and components	22
5.20	Overheating of the LPG cylinder and and its compartment	22
5.21	Ignition	23
5.22	Crosslighting	24
5.23	Flame stability	25
5.24	Combustion	26
5.25	Additional requirements	26

6	Test methods	28
6.1	General	28
6.2	Conversion to different gases	32
6.3	Materials	32
6.4	Cleaning and user maintenance	32
6.5	Strength of assembly	32
6.6	Soundness of the gas circuit assembly	33
6.7	Connections	35
6.8	Appliance stability, fixing and mobility devices	35
6.9	Taps and controls	35
6.10	Control handles, knobs or pushbuttons	35
6.11	Injectors	35
6.12	Ignition devices	36
6.13	Safety devices	36
6.14	Cylinder compartments	36
6.15	Verification of heat inputs	37
6.16	Effect of light back	39
6.17	Temperature of various parts of the appliance	40
6.18	Temperature of the support, walls and adjacent surfaces	40
6.19	Temperature of taps and components	41
6.20	Overheating of the LPG cylinder and its compartment	42
6.21	Ignition	42
6.22	Crosslighting	44
6.23	Flame stability	46
6.24	Combustion	48
6.25	Additional requirements	50
7	Marking and instruction literature	53
7.1	Data plate	53
7.2	Warning label	54
7.3	Packaging	54
7.4	Instructions for use and user maintenance	55
7.5	Instructions for installation	57
7.6	Specialist servicing instructions	57

Figures

Figure 1	Apparatus for testing soundness	34
Figure 2	Apparatus for measurement of increase of vapour pressure	43
Figure 3	Stability of flames: Example of an apparatus for the draught test	47
Figure 4	Details of probe	52
Figure A.1	Nozzles	62
Figure A.2	Union connector	63
Figure B.1	Vitiation room	65

Tables

Table 1	Classification of gases	13
Table 2	Maximum allowable pressure increase inside the LPG cylinder	23
Table 3	Test gases corresponding to the categories of appliances	29
Table 4	Characteristics of the test gases	30
Table 5	Test pressures	31
Table 6	Test gases and pressure for ignition tests	42
Table 7	Test gases and pressure for crosslighting tests	44
Table 8	Test gases, pressures and conditions for combustion tests	48

Annex A (Normative)	Special national conditions	58
Table A.1	Normal supply pressure for appliances	59
Table A.2	Appliance categories marketed in various countries	60
Table A.3	Types of connection used in various countries	61
Annex B (Normative)	Vitiation room	64
Annex C (Informative)	Air supply and ventilation	66
Annex Z.A (Informative)	Correspondence between this standard and EC Directive 90/396/EEC	67

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 181 "Dedicated liquefied petroleum gas appliances", the secretariat of which is held by NSAI.

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 August 1996, and conflicting standards shall be withdrawn at the latest by August 1996.

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

1 Scope

This standard specifies, for the purpose of type examination, 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'.

It covers the following types of appliance:

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 compartment for a transportable refillable liquefied petroleum gas cylinder.

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.

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

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.

This standard does not cover cylinders for liquefied petroleum gas or their associated regulators.

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 125	Flame supervision devices for gas burning appliances: Thermo-electric flame supervision devices.
EN 126	Multi-functional 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 549	Rubber materials for seals and diaphragms for gas appliances and gas equipment.
EN 60335-1:1988	Safety of household and similar electrical appliances Part 1: General 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 274	Copper tubes of circular section - Dimensions.

3 Definitions

For the purposes of this standard the following definitions apply:

3.1 appliance incorporating a cylinder: An appliance which includes a compartment for the cylinder.

3.2 auxiliary equipment: Auxiliary equipment includes:

- Tap and cocks;
- Flame supervision devices;
- Thermostats;
- Multifunctional controls;
- Automatic shut-off valves.

3.3 burner: Component that allows the gas to burn. It may be one of two types:

- **non-aerated burner**, in which the air for combustion is entrained entirely at the burner outlet;

- **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.

3.4 heat input: The product of the volume or mass rate and the calorific value of the gas (brought to the same reference conditions). It is expressed in kW.

3.5 nominal heat input of burner: The value of the heat input of a burner, as declared by the manufacturer.

3.6 volume rate: the volume of gas passed in unit time. This is expressed in m^3/h or in dm^3/h.

3.7 mass rate: the mass of gas passed in unit time. This is expressed in kg/h or g/h.

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 (d): The ratio of the mass of a volume of dry gas to the mass of an equal volume of dry air under the same temperature and pressure conditions.

3.10 ignition device: A device to ignite one or more burners directly or indirectly, for instance through a flash tube.

It may be either electric (resistance, spark.....), or thermal (pilot, ...).

3.11 flame supervision device: A 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 (W_S): This is given by the formula:

$$W_S = \frac{H_S}{\sqrt{d}}$$

where H is the gross calorific value of a gas expressed in megajoules per cubic metre, and d is its relative density.

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

- **calibrated injector**: where the section of the outlet orifice is fixed;
- **adjustable injector**: where the section of the outlet orifice is variable.

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

It may be:

- a conical joint;
- an O-ring joint;
- a flat-faced joint.

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

3.16 putting a control out of service: A control (of temperature, pressure, etc.) is said to be put out of service if it is put out of action and sealed in this position. The appliance then functions as if this device had been removed.

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

3.18 gas rate adjuster: A 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'.

3.19 gross calorific value (H_S): The 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 mbar or to per kg of dry gas.

3.20 gas supply pressure: The difference between the static pressure measured at the inlet connection of the appliance and the atmospheric pressure.

3.21 light back: Phenomenon characterized by the return of the flame inside the body of the burner.

3.22 tap: A device to adjust the heat input during use and/or isolate the gas supply to the various burners.

3.23 sealing of an adjuster: An action whereby the locking of an adjuster is achieved by a means such that any attempt to change the adjustment makes the interference with the adjuster apparent (e.g. breaking of a sealing material).

3.24 soft soldering: Soldering for which the lowest temperature of the melting range, after application, is less than 450 °C.

3.25 stability of flames: The flames are stable at the burner ports when the phenomena of flame lift or light back do not occur.

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

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

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