



# SLOVENSKI STANDARD

SIST EN 624:2002

01-april-2002

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Specification for dedicated LPG appliances - Room sealed LPG space heating  
equipment for installation in vehicles and boats

Festlegungen für flüssiggasbetriebene Geräte -Raumlufunabhängige Flüssiggas-  
Raumheizgeräte zum Einbau in Fahrzeugen und Booten

**iTeh STANDARD PREVIEW**

Spécifications pour les appareils fonctionnant exclusivement aux GPL - Appareils de  
chauffage a circuit étanche fonctionnant aux GPL a installer dans les véhicules et  
bateaux

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**ICS:**

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47.020.90

97.100.20

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ICS 43.040.60; 47.020.90; 97.100.20

English version

## Specification for dedicated LPG appliances - Room sealed LPG space heating equipment for installation in vehicles and boats

Spécifications pour les appareils fonctionnant exclusivement aux GPL - Appareils de chauffage à circuit étanche fonctionnant aux GPL à installer dans les véhicules et bateaux

Festlegungen für flüssiggasbetriebene Geräte - Raumluftunabhängige Flüssiggas- Raumheizgeräte zum Einbau in Fahrzeugen und Booten

This European Standard was approved by CEN on 10 April 2000.

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 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 March 2001, and conflicting national standards shall be withdrawn at the latest by March 2001.

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.

This standard only covers type testing.

NOTE: Attention is drawn in particular to prEN 1949 "Specification for the installation of LPG systems for habitation purposes in leisure accommodation vehicles and other vehicles" in regard to the harmonization of operating pressures to be used in vehicles.

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## 1 Scope

This European standard specifies the characteristics of safety, construction, performance and efficiency, the test methods and marking, of room sealed space heating equipment of type C (see CR 1749) with combustion air intake and outlet for the products of combustion in the wall, roof or floor, combined or not. These are referred to in the body of the text as "heaters", burning LPG, for road vehicles and boats.

The European standard only covers type testing of room sealed heaters also including those which have a combustion air fan, an integral hot air fan or both, only for road vehicles and boats which are used for residential, recreational and commercial purposes. For private cars and vehicles or boats used for the transport of dangerous goods or for commercial personnel transport additional requirements may be necessary. This European standard applies to heaters which are installed either outside or inside the habitable volume but which have a combustion circuit sealed from the vehicle's interior, a nominal heat input which does not exceed 15 kW ( $H_s$ ) operated at supply pressures of 30 mbar, 28 mbar, 37 mbar and 50 mbar, using, where appropriate, 12 V or 24 V DC electrical supply.

**NOTE** If a LPG operated heater is installed in a motorized vehicle being subject to European road traffic legislation, the directives of the Council for the approximation of the laws, regulations and administrative provisions of the member states relating to the heating of the interior of motor vehicles should be applied.

These heaters are also suitable for mobile homes and mobile units.

## 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 their publications apply to this European Standard only when incorporated in it by latest amendment or revision. For undated references the latest edition of the publication referred to applies.

|               |   |
|---------------|---|
| EN 161:1991   | Automatic shut-off valves for gas burners and gas appliances  |
| EN 298:1993   | Automatic gas burner control 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 gas equipment.   |
| EN 751-1      | Sealing materials for metallic threaded joints in contact with 1 <sup>st</sup> , 2 <sup>nd</sup> and 3 <sup>d</sup> family gases and hot water - Part 1: Anaerobic jointing compounds     |
| EN 751-2      | Sealing materials for metallic threaded joints in contact with 1 <sup>st</sup> , 2 <sup>nd</sup> and 3 <sup>d</sup> family gases and hot water - Part 2: Non-hardening jointing compounds |
| prEN 1949     | Specification for the installation of LPG-systems for habitation purposes in leisure accomodation vehicles and other vehicles   |
| EN 23166      | Codes for the representation of names of countries and their subdivisions -- Part 1: Country codes  |
| EN 50165:1997 | Electrical equipment of non-electric appliances for household and similar purposes - Safety requirements  |



|               |  |
|---------------|--|
| prEN 55025    | Limits and methods of measurement of radio disturbance characteristics for the protection of receivers used on board of vehicles |
| EN 60730-1    | Automatic electrical controls for household and similar use - Part 1: General requirements (IEC 60730-1:1993, modified)          |
| CR 1749       | European scheme for the classification of gas appliances according to the method of evacuation of products of combustion (types) |
| 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  |
| ISO 7637      | Road vehicles - Electrical disturbance by conduction and coupling  |
| IEC 60068-2-6 | Environmental testing - Part 2: Tests - Test Fc: Vibration (sinusoidal)  |

### 3 Terms and definitions

For the purposes of this standard the following terms and definitions apply:

#### 3.1

##### **caravan**

trailer leisure accommodation vehicle that meets the requirements for the construction and use of road vehicles

#### 3.2

##### **motor caravan**

self propelled leisure accommodation vehicle that meets the requirements for the construction and use of road vehicles

#### 3.3

##### **boat**

craft up to 24 m in length

#### 3.4

##### **mobile home and mobile unit**

transportable leisure accommodation vehicle that does not meet requirements for construction and use of road vehicles <https://standards.iteh.ai/catalog/standards/sist/9d65f3e6-6840-49ca-9ef9-f4a9eea10093/sist-en-624-2002>

#### 3.5

##### **space heater**

heating equipment installed inside or outside the habitable volume with a sealed combustion circuit

#### 3.6

##### **space heater installation box**

an enclosure that surrounds the heater in such a manner that a minimum distance is always maintained between the space heater and the adjacent walls

### 3.7

#### **liquefied petroleum gas (LPG)**

mixture of light hydrocarbons, gaseous under conditions of normal temperature and pressure and maintained in the liquid state by increase of pressure or lowering of temperature. The principal components are propane, propene, butane and butenes

### 3.8

#### **liquefied petroleum gas installation**

the components usually consisting of fuel container(s), pressure regulator(s), piping, hoses and shut-off devices, providing liquefied petroleum gas to appliances

### 3.9

#### **working pressure**

pressure at the inlet of the appliance while it is in operation

### 3.10

#### **piping**

pipeline of rigid metallic material

### 3.11

#### **pressure regulator**

device or system of devices to reduce the inlet pressure and to maintain the pressure required to operate a heater and/or other appliances

### 3.12

#### **room sealed heater**

heater that has the combustion circuit isolated from the habitable volume in which the heater is installed

### 3.13

#### **combustion circuit**

the entire arrangement inside the habitable volume of the vehicle from the combustion air intake to the flue outlet, including the actual space heater and all connecting pipes and other combustion air or exhaust gas conducting parts

### 3.14

#### **combustion air supply**

that part of the combustion circuit through which the combustion air is supplied from outside

### 3.15

#### **injector**

calibrated component that admits the gas into a burner

### 3.16

#### **flue**

duct designed to convey the products of combustion to the exterior of a vehicle or boat

### 3.17

#### **flue outlet; cowl**

that part of the combustion circuit through which the products of combustion are discharged to the outside

### 3.18

#### **wind protection device**

cover over the combustion circuit openings on the outside of the vehicle, which protects the circuit from unacceptable effects of the wind (e.g. deflector plates, covering hoods)

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**3.19**  
**space heater cover**

that part which encloses the sides of the heat exchanger facing the installation area and conducts the air to be heated past the heat exchanger to the outlet openings

**3.20**  
**combustion air fan**

device which assists the flow of the combustion air or of the products of combustion

**3.21**  
**integral hot air fan**

component of the space heater which provides heat dissipation and is essential for the proper function of the heater

**3.22**  
**hot air distribution devices**

devices which do not form a direct part of the heater (e.g. non-integral fan, pipe fittings, blown-air outlets) and which distribute the hot air generated by the heater around the inside of the vehicle or boat

**3.23**  
**heating water distribution devices**

devices, which do not form a direct part of the heater (e.g. pump, pipes, hoses, convectors) and which distribute heating water generated by the heater around the inside of the vehicle or boat

**3.24**  
**control devices**

devices which change or stop the flow of gas by means of actuating mechanisms consisting of a control valve and a valve actuator

**3.25**  
**tap**

device to open or close the gas supply to the various burners and to adjust their rate during use to a predetermined value, called the reduced rate

**3.26**  
**tap handle**

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

**3.27**  
**control valve**

device to change or stop the flow of gas by the closure and/or the partial closure of an orifice

**3.28**  
**valve actuator**

device which operates (manually, electrically, hydraulically or pneumatically) a control valve

**3.29**  
**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

**3.30**  
**automatic burner control**

device which consists of a flame detector which signals the presence or absence of a flame and of a control box which is actuated by the signals of the flame detector and which starts or shuts down the

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burner according to an established programme

### 3.31

#### **fail safe device**

device which causes, in the event of internal or external faults, either a safe operation or a safety shut-down

### 3.32

#### **spark restoration**

automatic process by which, following flame failure, the ignition device is switched on again without interruption of the gas supply

### 3.33

#### **recycling**

automatic process by which, after loss of flame during operation, the gas supply is interrupted and the full start procedure is re-initiated automatically (normally after a minimum required waiting time, without a fan or prepurge time, with a fan)

### 3.34

#### **ignition device**

device which lights the ignition burner/main burner(s) with the aid of external energy (e. g. a spark)

### 3.35

#### **ignition interlock**

device for preventing direct ignition of the main burner at full rate

### 3.36

#### **restart interlock**

device which prevents re-opening of the control element during the time when the flame supervision device is open

### 3.37

#### **ignition process**

process which may consist of the following individual stages:

- Stage 1: lighting of the gas stream by an ignition source;
- Stage 2: ignition transfer from a ignition burner to the main burner or between several burners (cross-lighting);
- Stage 3: complete ignition of individual burners (if they do not consist of a single flame)

### 3.38

#### **ignition burner**

small burner that provides a continuously burning flame to ignite a main burner when required. This is sometimes referred to as a pilot

### 3.39

#### **waiting time**

- for thermoelectric flame supervision devices, the time to be kept by the operator between the closing and re-opening of the gas supply;
- for automatic burner control systems in the case of a restart, the time between valve closure on flame loss and valve re-opening

### 3.40

#### **ignition delay time**

time between the signal of loss of flame and start of ignition at reignition

### 3.41

#### **extinction safety time**

- for a thermoelectric flame supervision device, the time that elapses between the disappearance of the supervised flame and the interruption of the gas supply;
- for automatic burner control units, the time between the extinction of the supervised flame and the start of recycling

### 3.42

#### **ignition safety time**

- for a thermoelectric flame supervision device, the time between the ignition of the flame and the moment when the closure element is held open by the flame signal;
- for automatic burner control units, the time at a starting procedure between the signals for the opening and closing of the gas supply if no flame is recognised

### 3.43

#### **thermostat**

automatic device to maintain a selected sensibly constant temperature

### 3.44

#### **external gas soundness**

the soundness of gas-carrying parts to the atmosphere

### 3.45

#### **internal gas soundness**

the soundness of one gas-carrying part to another

### 3.46

#### **soft solder**

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

### 3.47

#### **sound mechanical joint**

connection device assuring soundness in an assembly made up of several parts, generally of metal

### 3.48

#### **heat input of burner**

product of the volume or mass rate and the calorific value of the gas (brought to the same reference conditions). It is expressed in kilowatts

Symbol:  $Q$ .

### 3.49

#### **nominal heat input of a burner**

the value of the heat input of the burner, as declared by the manufacturer

Symbol:  $Q_n$ .

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### 3.50

#### **heat output**

the value of the heat input multiplied by the efficiency factor

### 3.51

#### **volume rate**

the volume of gas passed in unit time. This is expressed in cubic metres per hour or in litres per hour (cubic decimetres per hour)

Symbol:  $V$ .

### 3.52

#### **mass rate**

mass of the gas passed in unit time. This is expressed in kilograms per hour or grammes per hour

Symbol:  $M$ .

### 3.53

#### **calorific value**

quantity of heat produced by complete combustion at a constant pressure equal to 1 013,25 mbar, of unit volume or mass of the gas, the components of the fuel mixture being at 15 °C, 1 013,25 mbar and the products of combustion being brought to the same conditions

There are two calorific values:

- the gross calorific value ( $H_g$ ): the water produced by combustion is assumed to be condensed;
- the net calorific value ( $H_n$ ): the water produced by combustion is assumed to be retained in the vapour state.

For the purposes of this standard only the gross calorific value is used.

The calorific values are expressed in units of energy referred:

- either to the unit volume of dry gas measured under normal reference conditions: 15 °C, 1 013,25 mbar. It is usually expressed in megajoules per cubic metre (MJ/m<sup>3</sup>);
- or to the unit mass of dry gas. It is then usually expressed in megajoules per kilogramme (MJ/kg)

### 3.54

#### **Wobbe index**

the ratio of the calorific value of a gas, by unit of volume, and the square root of the relative density of the same gas. The Wobbe index is called gross when the calorific value considered is the gross calorific value (see 3.53). It is usually expressed in megajoules per cubic metre (MJ/m<sup>3</sup>)

Symbol:  $W_s$ .

### 3.55

#### **stability of flames**

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

### 3.56

#### **light back**

phenomenon characterized by the return of the flame inside the body of the burner

### 3.57

#### **flame lift**

phenomenon characterised by the partial or total movement of the base of the flame away from the burner port

### 3.58

#### **cold condition**

condition of the heater obtained by allowing the unlit heater to attain equilibrium at room temperature

### 3.59

#### **hot condition**

condition of the heater obtained by heating to thermal equilibrium at the adjustment pressure, any thermostat remaining fully open

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### 3.60

#### minimum operational rate

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

## 4 Classification

### 4.1 Classification of gases

Gases likely to be used are classified in families according to the value of their Wobbe index based on gross calorific value ( $H_s$ ).

**Table 1 - Classification of gases**

| Category                            | Wobbe index in MJ/m <sup>3</sup> ; $H_s$ at 15 °C |
|-------------------------------------|---|
| $I_{3\text{B/P}}, I_{3+(28/30-37)}$ | between 72,9 and 87,3                             |
| $I_{3\text{P}}$                     | between 72,9 and 76,8                             |
| $I_{3\text{B}}$                     | between 81,8 and 87,3                             |

### 4.2 Classification of heaters

Heaters are classified in categories according to the gases 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.

Tables A.1, A.2 and A.3 include the gas distribution conditions and types of connection applicable to each country.

This specification only covers appliances of the following categories:

- 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;
- appliances in Category  $I_{3\text{B/P}(30)}$  which may be used with propane, butane or mixes of these gases at a nominal operating pressure of 28 mbar or 30 mbar;
- appliances in Category  $I_{3\text{B/P}(50)}$  which may be used with propane, butane or mixes of these gases at a nominal operating pressure of 50 mbar;
- appliances in Category  $I_{3\text{B}(28-30)}$  which may be used with butane only at a nominal operating pressure of 28 mbar or 30 mbar;
- appliances in Category  $I_{3\text{P}(30)}$  which may be used with propane only at a nominal operating pressure of 30 mbar;
- appliances in Category  $I_{3\text{P}(37)}$  which may be used with propane only at a nominal operating