



**SLOVENSKI STANDARD**  
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Specifications for dedicated liquefied petroleum gas appliances - Absorption refrigerators

Festlegungen für Flüssiggasgeräte - Absorber-Kühlschränke

Spécifications pour les appareils fonctionnant exclusivement aux gaz de pétrole liquéfiés  
- Réfrigérateurs a absorption

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EUROPEAN STANDARD

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English version

## Specifications for dedicated liquefied petroleum gas appliances - Absorption refrigerators

Spécifications pour les appareils fonctionnant  
exclusivement aux gaz de pétrole liquéfiés - Réfrigérateurs  
à absorption

Festlegungen für Flüssiggasgeräte - Absorber-  
Kühlschränke

This European Standard was approved by CEN on 16 October 1998.

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.

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

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

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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of an identical text or by endorsement, at the latest by May 1999, and conflicting national standards shall be withdrawn at the latest by May 1999.

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.

This European standard applies only to type testing.

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

Particular attention should be paid to the suitability of non metallic materials used in the construction of these appliances. A European Standard specifying "Requirements for rubber materials for seals and diaphragms for gas appliances and equipment" has been prepared by CEN /TC 108 (EN 549). A European Standard for "Flexible hose, tubing and assembles for use with butane or propane in the vapour phase" is being prepared by CEN/TC 218. These standards will be applicable to these types of appliances.

This European standard does not deal with the refrigeration aspects of the appliance and contains no specific requirements or tests for this.

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.

## 1 Scope

This standard defines the constructional features, safety and operational requirements, test techniques and marking of absorption refrigerators using commercial butane and propane (referred to within the text as “appliances”).

This standard is applicable to room sealed (Type C<sub>11</sub>) and flueless (Type A<sub>11</sub>), as defined in CR 1749, refrigerators using gas equipment fuelled by third family gases as classified in 4.2. This standard only applies to type testing.

The gas consumption of absorption refrigerators is of the same order of magnitude as pilots currently used on other types of burners, maximum being 60 g/h. Consequently efficiency measurement is not considered relevant for these appliances and is not covered by this standard. This standard does not cover the requirements for LPG gas containers and 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 their 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	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 298	Automatic gas burner control systems for gas burners and gas burning appliances with or without fans
EN 437	Test gases - Test pressures - Appliances categories
EN 60335-1	Safety of household and similar electrical appliances - Part 1: General requirements

EN 60335-2-24	Safety of household and similar electrical appliances - Part 2: Particular requirements for refrigerators, food-freezers and ice makers
EN 60730-2-1	Automatic electrical controls for household and similar use - Part 2: Particular requirements for electrical controls for electrical household appliances
EN 60730-2-9	Automatic electrical controls for household and similar use - Part 2: Particular requirements for temperature sensing controls
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
ISO 274	Copper tubes of circular section - Dimensions
CR 1749	European scheme for the classification of gas appliances according to the method of evacuation of the products of combustion (types)

### 3 Definitions

For the purposes of this standard, the following definitions apply:

**3.1 auxiliary equipment:** all controls and devices that can affect the safety of operation of a gas appliance, for example:

- taps;
- flame supervision devices;
- thermostats.

**3.2 appearance of yellow tips:** Phenomenon characterized by the appearance of yellow colouration at the top of the blue cone on aerated flames.

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**3.3 built-in-appliance:** An appliance which is intended for fitting into a cupboard or a kitchen unit in a space cut into a panel or similar. Because of this the appliance does not necessarily have a casing on all sides.

**3.4 burner:** A 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, termed secondary air, is drawn in after the burner outlet.

**3.5 calorific value:** The 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 (symbol  $H_g$ ) : the water produced by combustion is assumed to be condensed;
- the net calorific value (symbol  $H_n$ ) : 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 expressed in megajoules per cubic metre (MJ/m<sup>3</sup>);
- or to the unit mass of dry gas. It is then expressed in megajoules per kilogramme (MJ/kg).

**3.6 control handle:** Component intended for manual use to control the opening and closing, totally or partially, of a valve.

**3.7 detachable:** That which can be dismantled without using a tool.

**3.8 feed piping:** Piping intended for distribution of gas to the burner.

**3.9 flame lift:** Phenomenon characterized by the partial or total movement of the base of the flame away from the burner port.

**3.10 flame supervision device:** A device which, under the influence of the flame on the sensing element, keeps open the gas flow to the burner and which cuts off at least the gas supply to the burner in case of extinction of the supervised flame.

**3.11 gas rate adjuster:** A device allowing gas rate to a burner to be set at a predetermined value according to the supply conditions. The adjustment can be continuous (adjustment screw) or discontinuous (changing the calibrated orifices, ...). The operation of changing the setting of this device is termed the "adjustment of the gas rate".

**3.12 gas supply pressure:** The difference between the static pressure measured at the gas inlet to the appliance and the atmospheric pressure.

**3.13 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 kilowatts (kW). Symbol :  $Q$ . For the purposes of this standard, only the heat input calculated from the gross calorific value is considered. (See 3.5).

**3.14 ignition device:** A device to ignite a burner directly. It may be

- either electric (resistance, spark, etc.):
- or thermal (flame, etc.).

**3.15 injector:** A component part that admits the gas into an aerated and sealed combustion burner. Injectors considered in this standard are calibrated injectors where the section of the outlet orifice is fixed.

**3.16 light back:** Phenomenon which is characterized by the return of the flame inside the body of the burner.

**3.17 mass rate:** The mass of gas passed in unit time. It is expressed in kilograms per hour (kg/h) or in grams per hour (g/h.) Symbol :  $M$ .

**3.18 means of sealing:** Any static or dynamic device designed to ensure soundness, for example: flat-faced joints, O-ring joints, conical joints, diaphragms, grease, pastes, putties....

**3.19 nominal heat input of a burner:** Value of heat input of the burner, as declared by the manufacturer. Symbol :  $Q_n$ .

**3.20 relative density:** Ratio of the masses of a volume of dry gas to an equal volume of air under the same conditions of temperature and pressure.

**3.21 removable:** That which can only be removed with a tool.

**3.22 restrictor:** Device having a calibrated orifice which is placed in the gas circuit between the inlet of the appliance and the burner, in such a way as to create a pressure loss and thus bring down the gas pressure at the burner to a pre-determined value.

**3.23 sealing of an adjuster/governor:** Any arrangement relating to the adjuster whereby any change to the adjustment causes breaking of the sealing device and makes interference with the adjuster apparent. The adjuster is said to be sealed in the adjusted position. A factory-sealed adjuster is regarded as non-existent.

**3.24 soft solder:** Solder 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 tap:** A device designed to open or close the gas supply to a burner and eventually to adjust its rate during use.

**3.27 thermostat:** Component intended to maintain sensibly constant temperatures automatically.

**3.28 volume rate:** The volume of gas passed in unit time. It is expressed in cubic metres per hour (m<sup>3</sup>/h), the gas being dry and under the reference test conditions. Symbol : *V*.

**3.29 Wobbe index:** The ratio of the calorific value of a gas, by unit of volume, and the square root of the density of the same gas. The Wobbe index is called gross when the calorific value considered is the gross calorific value (see 3.5). It is expressed in megajoules per cubic metre (MJ/m<sup>3</sup>). Symbol : gross Wobbe index *W<sub>g</sub>*

## 4 Classification

### 4.1 Classification of gases

Gases used are classified in families and groups according to their Wobbe number.

According to EN 437, the third family, grouping liquefied petroleum gases, covers Wobbe indexes between 72,9 MJ/m<sup>3</sup> and 87,3 MJ/m<sup>3</sup> (*W<sub>g</sub>* at 15 °C and 1013,25 mbar). It is subdivided into two groups, group P which covers the range of Wobbe indexes between 72,9 and 76,8 MJ/m<sup>3</sup> and group B which covers the range of Wobbe indexes between 81,8 MJ/m<sup>3</sup> and 87,3 MJ/m<sup>3</sup>.

Groups P and B are not considered independently by this standard.

### 4.2 Classification of appliances

Appliances are classified into categories according to the gases that they use. However, for each country, only some of the categories mentioned below are applicable, on account of local gas supply conditions (types of gas and supply pressures). For these categories, no

requirement different from those defined in this standard shall be applied.

The gas supply conditions and types of connection applicable to each country are given in Annex A.

Appliances within the field of application of this standard belong to the following categories:

a) Category  $I_{3\text{ B/P}}^{(30)}$

Appliances capable of using gases of the third family (propane, butane or their mixtures) without adjustment at normal supply pressures from 28 mbar to 30 mbar;

b) Category  $I_{3\text{ B/P}}^{(50)}$

Appliances capable of using gases of the third family (propane, butane or their mixtures) without adjustment at normal supply pressure of 50 mbar;

c) Category  $I_{3+}^{(28-30/37)}$

Appliances capable of using gases of the third family (butane and propane) and operating without adjustment on the appliance using a pressure couple. For butane, appliances in this category may be used without adjustment at normal supply pressures from 28 mbar to 30 mbar, for propane they are used at a normal supply pressure of 37 mbar.

## 5 Constructional and safety characteristics

### 5.1 Test methods

The test methods for verifying the compliance of the appliance to the requirements of this clause are indicated in clause 6.

### 5.2 Conversion to different gases

The appliance shall operate under normal supply conditions specified in the instructions, without requiring any intervention.

Adjusters and governors, if used, shall be set and sealed by the manufacturers.

### 5.3 Materials

The quality and thickness of material used in the construction of an appliance and the assembly method of different components shall be such that the characteristics of construction and performance are not altered under the normal conditions of installation and 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 when installed in compliance with the manufacturer's instructions.

In normal conditions of use, cleaning and maintenance, the materials shall not be liable to any alterations which might impair their performance or safety.

Sheet metal parts not made of corrosion resistant material shall be covered with an effective protection against corrosion, or have a minimum thickness of 1 mm.

Asbestos or materials containing asbestos shall not be used.

Feed piping shall be metallic but not of aluminium or brass. Copper tubes shall be internally supported by a steel insert at the point of connection when an olive compression fitting is used.

### 5.4 Cleaning and maintenance

Cleaning and maintenance shall be described in the manufacturer's instructions. Any part of the appliance requiring cleaning by the user shall be easily accessible without having to move the appliance or use a tool for dismantling. It shall be possible to replace such parts correctly and without difficulty.

Sharp corners and edges which could give rise to injury, for example during the cleaning of the appliance, shall be avoided.

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

Any part of the appliance installed or adjusted at the factory and which does not need to be manipulated by the user shall be protected in appropriate fashion and only be removable with a tool.

### 5.5 Strength of the appliance

The construction of the appliance shall be such that, during normal conditions of use:

- any displacement of parts;

- any distortion;
- any deterioration

likely to impair its good performance will not occur.

### 5.6 Soundness of the gas circuit assembly

Holes for screws, pins etc., intended for the assembly of components shall not open into the space reserved for the gas ways leading to the injector.

The soundness of parts and assemblies connected to the gas circuit shall be assured by means of metal-to-metal joints or joints with seals (for example, washers, O-rings, gaskets.), i.e. excluding the use of any product which ensures soundness in the threads.

However, for parts that do not require to be dismantled during normal maintenance, for example taps, injectors, the use of appropriate thread sealing compounds is permitted.

Soft solder shall not be used to ensure the soundness of the gas circuit. However, it is permitted for internal connections within the gas circuit when they do not involve soundness.

Removable components or the threaded parts of the pipework which may be dismantled during normal maintenance shall remain sound after five disconnections and re-connections in accordance with the manufacturer's instructions, if necessary after changing a gasket where such exists.

Under the test conditions specified in 6.6.2, the leak detected during each of the tests n° 1 and n° 2 shall not exceed 0,01 dm<sup>3</sup>/h.

This requirement shall also be satisfied after all the appliance tests have been carried out according to this European Standard, but before any of the components used in the soundness tests have been removed.

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### 5.7 Connections

The end of the supply pipework of the appliance shall be one of the following types:

a) for fixed appliances:

- 1) without a thread: metallic tube, the extremity of which shall be cylindrical, smooth and clean for a length of at least 30 mm, to allow connection by means of a gas-tight compression fitting, e.g. olive;
- 2) with a thread: conforming to ISO 7-1 or ISO 228-1, nominal sizes ½ , 3/8 or ¼ (major diameter nominal 21 mm, 17 mm or 13 mm);



- 3) for connection to copper tube according to ISO 274 (compression or capillary fittings);
- b) for mobile or portable appliances : the end of the supply pipework shall be fitted with
  - 1) either a nozzle allowing the connection of a flexible tube, the nozzle may be fixed or detachable (see figure A.1)
  - 2) or a union connector, for a hose assembly (see figure A.1)

**NOTE:** Requirements of 1) and 2) are considered to be met if the nozzle or union connector is factory fitted with a flexible tube or hose assembly and possibly pressure regulator to meet customer demand.

Specific national situations with regard to connections are as indicated in A.2.

## 5.8 Fixing the appliance

Appliances intended to be fixed in position shall include in their instructions details of how this fixing is to be achieved.

No part of the gas supply equipment or the exhaust piping may be used for fixing the appliance. See also 7.2.

## 5.9 Taps and controls

### 5.9.1 General

Each appliance connected to a permanent piping shall be controlled by a tap or component easily accessible to the user which allows the opening and closing of its gas supply.

All parts of a control shall be clean (for example free of swarf).

If the operation of the valve is realized by rotation, the closing action shall be clockwise.

Taps shall be placed in such a way that their strength, operation, manipulation and accessibility undergo no damage from the actions to which they are subjected in normal use. They shall be protected against external clogging.

Moreover, after testing in accordance with 6.19, their manipulation shall remain easy.

Taps shall be mounted in such a way that no accidental movement relative to the gas supply circuit is possible. Taps shall be removable from the gas line for maintenance and inspection.