BRITISH STANDARD

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521:2006

Specifications for dedicated liquefied petroleum gas appliances — Portable vapour pressure liquefied petroleum gas appliances

The European Standard EN 521:2006 has the status of a British Standard

ICS 27.060.20

BSI
British Standards

National foreword

This British Standard is the official English language version of EN 521:2006. It supersedes BS EN 521:1998 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee CSE/24, Dedicated LPG appliances, which has the responsibility to:

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Festlegungen für Flüssiggasgeräte - Tragbare, mit Dampfdruck betriebene Flüssiggasgeräte

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Foreword

This European Standard (EN 521:2006) 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of an identical text or by endorsement, at the latest by August 2006, and conflicting national standards shall be withdrawn at the latest by August 2006.

This European Standard supersedes EN 521:1998.

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 document.

This European Standard only applies to type testing.

In 2001 the Netherlands raised a formal objection in respect of 5.7.2.1 "appliances fitted to pierceable cartridges" of standard EN 521:1998, on the grounds that it does not fully satisfy the essential requirements of Directive 90/396/EEC.

The decision of the commission was that the standard EN 521:1998 shall continue to confer the presumption of conformity to the relevant provisions of Directive 90/396/EEC.

At the same time, the European mandate M/327 was created, with the aim of taking into account the risks emerged by the particular condition of the replacement of the gas cartridge in portable (camping) gas appliances, in order to improve the intrinsic level of safety with regards to the replacement of the cartridge. The revision of this European Standard is an answer to this mandate M/327.

In the view of answering to this mandate, CEN/TC 181/WG 4 carried out a study on the pierceable appliances, whose conclusions are integrated in this European Standard. The modifications brought to this European Standard are focused on 5.7.2.1, and are the answer to the mandate M/327.

A new informative annex (Annex C) is also included, and supplements the changes brought to paragraph 5.7.2.1. It gives examples of authorized solutions, which specify the connecting requirements regarding the replacement of pierceable cartridges.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

1 Scope

This European Standard specifies the construction and performance characteristics related to safety and the rational use of energy of portable appliances burning liquefied petroleum gases at the vapour pressure within the gas container. It also defines test methods and the requirements for marking and the information to be given in the instructions.

NOTE These appliances are referred to in the body of the text as "appliances".

This European Standard applies to various types of portable appliances burning liquefied petroleum gases at vapour pressure and designed to be used with (non refillable) cartridges as complying with EN 417 or any types of gas cylinders other than cartridges. For example the following types of appliances are covered:

a) cooking appliances (hotplates, grills, barbecues...).

   This European Standard does not cover barbecues that can be used indoors;

b) lighting appliances;

c) heating appliances.

   This European Standard only applies to appliances with a maximum heat input of up to 3 kW (H_s) for outdoor use only;

d) blowlamps.

   This European Standard only applies to blowlamps without a flexible hose;

e) laboratory burners.

The requirements apply to these appliances or their functional sections whether or not the latter are independent or incorporated into an assembly.

This European Standard only applies to type examination.

Appliances covered by this European Standard are not connected to a flue for the discharge of products of combustion and are not connected to the mains electricity supply.

This European Standard covers neither appliances supplied with LPG in the liquid phase nor those incorporating a fixed gas reservoir which may or may not be refilled by the user. This European Standard does not cover gas containers or flexible hose.

It does not apply to smokers' lighters covered by EN ISO 9994.

Requirements for rational use of energy have been included for hotplate burners.

However, such requirements have not been included for the other types of appliances because:

— for grills and barbecues, this is a type of cooking which is achieved by various means such as radiant elements; in addition this type of cooking varies according to the type of food and region where the appliance is used;

— for lighting appliances, the consumption is insignificant because these appliances have a very low rate and are used only for a few hours in a year;

— for heating appliances, all the heat produced is discharged into the environment;

— for tools such as blowtorches which are not professional tools in regular use, the gas consumption depends very much on the way it is used.

2 Normative references

The following referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 30-1-1, *Domestic cooking appliances burning gas fuel — Part 1-1: Safety — General*

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

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

EN 60335-1:2002, *Household and similar electrical appliances — Safety — Part 1: General requirements (IEC 60335-1:2001, modified)*

ISO 301, *Zinc alloy ingots intended for casting*

3 Terms and definitions

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

3.1
cooking device
devices supplied with the appliance designed to hold or receive the food to be cooked

NOTE grid, turnspit, baking tray etc.

3.2
detachable
possible to dismantle without using a tool

3.3
vapour pressure appliance
pressure at the inlet of the appliance is equal to the pressure in the gas container.

If the appliance is fixed directly to the gas cylinder by a rigid connection, the appliance inlet is the part of the connection that takes the gas from the cylinder. A pressure reducing device may be incorporated in the gas circuit, between the gas inlet and the injector.

If the appliance is connected to the gas container by a flexible hose, the pressure in the flexible hose once it is connected to the gas container is equal to the pressure in the gas container. A pressure reducing device may be incorporated in the gas circuit downstream of the flexible hose

3.4
appliance with fixed integral container
appliance incorporating a gas container which is not intended to be disconnected for refilling

NOTE See Clause 1

3.5
auxiliary equipment
control and device that can affect the safety of operation of a gas appliance

NOTE for example valves, flame supervision devices

3.6
barbecue
appliance designed principally to roast and/or grill food. Cooking is carried out by radiant heat and, possibly, by convection

3.7
locking of an adjuster
action performed by the manufacturer or by an installer, in its adjustment position by any means

NOTE e.g. a screw etc.

3.8
soft solder
solder for which the lowest temperature of the melting range, after application, is less than 450 °C

3.9
turnspit
cooking device enabling the rotation of the food to be roasted.

NOTE The rotation can be manual or using a mechanical or electrical motor (battery)

3.10
burner
component that allows the gas to burn.

— ignition burner: small burner whose flame is designed to light a main burner. It is referred to as "pilot" in this European Standard;

— main burner: burner designed to fulfil a thermal function of the appliance. It is referred to as "burner" in this European Standard

3.11
gas cartridge
non-refillable container with a maximum capacity of 1 000 ml filled with gas or a gas mixture.

It may be fitted with a valve. If it is not fitted with a valve, the release of gas is carried out following perforation of the cartridge by means of a device incorporated in the appliance

3.12
heat input
product of the mass rate and the gross calorific value of the gas brought to the same reference conditions.

NOTE It is expressed in kilowatts. The nominal heat input of a burner is the value of the heat input declared by the manufacturer

3.13
flame lift
phenomenon characterized by the partial or total movement of the base of the flame away from the burner port

3.14
removable
removal only possible with a tool

3.15
ignition device
device to ignite one or more burners directly or indirectly

3.16
flame supervision device
device which, due to the presence of a flame on the sensing element, keeps open the gas flow to the burner and any pilot and which cuts off the gas supply to the burner and possibly a pilot in the event of extinction of the supervised flame

3.17
grid
cooking device designed to hold the food to be cooked.

NOTE Its useful component(s) can be rigid or flexible

3.18
grid with flexible useful components
<wallet grid>

made up of two jointed components enabling tight gripping of the food to be cooked.

NOTE Each component consists of a rigid frame on which metallic wires are fixed and form a flexible mesh inside the frame distorting around the food

3.19
griddle
part of a hotplate consisting of a plate placed above a burner, that allows the cooking of food by direct contact with the surface of the plate which is brought to a high temperature

3.20
radiant grill
appliance or part of an appliance allowing cooking by radiation from a surface brought to a high temperature

3.21
pan support
support placed above an open hotplate burner and designed to support the pan to be heated

3.22
glass panel
glass surface or part of a glass surface allowing the inside of an enclosure to be seen

3.23
injector
component part that admits the gas into an aerated burner

NOTE An injector is said to be calibrated when the section of the outlet orifice is fixed.

3.24
control handle
component designed to be operated manually so as to operate a control of the appliance

NOTE e.g. a tap, thermostat etc.

3.25
means of sealing
static or dynamic device designed to ensure soundness

NOTE for example: flat-faced joints, O-ring or conical joints, diaphragms, grease, pastes, putties etc.

3.26
gripping area
outside part of the appliance designed to be handled in normal use

3.27
primary air adjuster
device allowing the primary aeration rate of a burner to be set to a predetermined value according to the supply conditions.

NOTE The action consisting in operating this device is termed "primary air adjustment"

3.28
gas rate adjuster
device allowing the gas rate to a burner to be set at a predetermined value according to the supply conditions.

NOTE 1 The adjustment can be continuous (adjustment screw) or discontinuous (change of calibrated orifices).

NOTE 2 The action of changing the setting of this device is termed the "adjustment of the gas rate"

3.29
useful part of a cooking device
part of the device in contact with food during cooking

3.30
calorific value
quantity of heat produced by complete combustion at a constant pressure of 1 013,25 mbar, of unit mass of the gas, the constituents of the gas mixture being at 0 °C or 15 °C, 1 013,25 mbar and the products of combustion being brought to the same conditions.

NOTE 1 In this European Standard, the gross calorific value (symbol H_s) is used, that is to say that the water produced by combustion is assumed to be condensed.

NOTE 2 The calorific value is expressed in units of energy per unit of mass of dry gas. It is expressed in megajoules per kilogramme (MJ/kg)

3.31
gas supply pressure
difference between the static pressure measured at the gas inlet connection of the appliance and the atmospheric pressure. It is expressed in bar

3.32
hotplate
cooking appliance incorporating one or several burners and a pan support(s) designed in such a way that it(they) can support the vessels containing the food

3.33
hotplate with grill
cooking appliance consisting of a hotplate and a radiant grill

3.34
light back
phenomenon characterized by the return of the flame inside the body of the burner

3.35
tap
device designed to isolate a burner from the gas supply pipework and possibly to adjust its rate during use

3.36
sealing of an adjuster
means of locking an adjuster, such that any attempt to change the adjustment causes the breaking of the sealing device or sealing material and makes the interference with the adjuster apparent.

NOTE 1 The adjuster is said to be sealed in the adjusted position

NOTE 2 A factory sealed adjuster is considered as non existent

3.37
stabilizer
device which is integral with an appliance or which can be fixed to it designed to increase stability

3.38
flame stability
flames are stable at the burner ports when the phenomena of flame lift or light back do not occur

3.39
ignition delay time
time between the ignition of the supervised flame and the moment when the effect of this flame is sufficient to keep the closing device open

3.40
extinction delay time
time between the extinction of the supervised flame and the closure of the gas supply to the burner and possibly a pilot

4 Classification

4.1 Classification of gases:

Gases likely to be used are classified in three groups according to their pressures:

a) butane:

Mixture of hydrocarbons containing mainly butanes and butenes having a maximum pressure of 8 bar gauge at 50 °C;

b) butane-propane mixture:

Mixture of hydrocarbons containing mainly butanes, butenes, propane and propene having a pressure between 8 bar gauge and 12 bar gauge at 50 °C;

c) propane:

Mixture of hydrocarbons containing mainly propane and propene having a pressure above 12 bar gauge at 50 °C.

4.2 Categories of appliances:

Appliances are classified in three categories according to the gases likely to be used:

— category direct pressure – butane;

— category direct pressure - butane-propane mixture;

— category direct pressure - propane.

5 Safety requirements

5.1 General

The test methods and the means of verification are indicated in Clause 6.

5.2 Conversion to different gases

Unless necessary so as to adjust the flame for various types of work (for example: tools such as blow lamps, laboratory burners), the appliances shall not incorporate any adjuster (other than controlling the gas flow) intended to be adjusted by the user.

5.3 Materials

Non-metallic materials used as radiant elements in appliances (for example volcanic rocks, refractory blocks) shall be of a quality suitable to their use. The appliance manufacturer shall give the identification of the element to be used in the user instructions.

The quality and thickness of materials used in the construction of appliances shall be such that the constructional and performance characteristics are not altered in use. In particular all the parts of the appliance shall withstand mechanical, chemical and thermal actions to which they may be submitted during use. In normal conditions of operation, of cleaning or of adjustment, they shall not be liable to any alterations which might impair their performance.

Sheet-metal parts, not made of corrosion-resistant material, shall be effectively protected against corrosion. This requirement does not apply to grilles supporting lava rocks nor to cooking devices.

Seals and joining compounds shall have characteristics suited to their use.

Rubber based materials shall comply with EN 549.

Copper tubing shall be used upstream of the injector only if its temperature does not exceed 100 °C when the test described in 6.21 is carried out.

Asbestos or asbestos based materials shall not be used.

The nature and finish of materials likely to be in contact with food shall be such that they cannot contaminate or affect the food.

Zinc alloys shall not be used in contact with gas unless they are of ZnAl4 or ZnAl4Cu in accordance with ISO 301 and provided that such parts do not exceed a temperature above 80 °C under the test conditions in 6.21.

With the exception of seals, parts in contact with gas shall not be made of plastics.

5.4 Assembly, cleaning and maintenance

5.4.1 Assembly

The entire appliance gas circuit, including the injector, shall be assembled by the manufacturer.

Parts, whose assembly is carried out by the user, shall be able to be assembled correctly by following the instructions given in the instructions.

It shall not be possible to dismantle parts which are adjusted at the factory, which are not intended to be dismantled by the user and whose dismantling would affect safety, without using tools. If dismantling is possible using an open ended spanner or a screwdriver, direct access to such nuts and screw heads shall not be possible, unless they are sealed.

If a pressure reducing device is integrated in the gas circuit (see 3.3), it shall not be removable nor replaceable by the user. This device may provide the functions of adjustment, opening and closing of the gas flow.

The appliance gas circuit shall not incorporate a reservoir placed between the appliance gas inlet connection and the valves, intended to receive part of the gas in the liquid phase contained in the supply vessel during connection.

5.4.2 Cleaning, maintenance

All parts of the appliance requiring frequent cleaning by the user shall be easily accessible. It shall be possible to put these parts back correctly.

There shall be no sharp corners and edges on the accessible parts of an appliance which could give rise to injury, for example during cleaning.

5.5 Strength and stability

5.5.1 Strength

5.5.1.1 General

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

— any displacement of parts;

— any distortion;

— any deterioration

likely to impair safe operation will not occur.

5.5.1.2 Hotplate pan supports

The application of a mass as described in 6.5.1.2 on the pan support shall not cause any breakage or permanent distortion of the pan support exceeding 1 mm.

5.5.1.3 Glass components

The accessible edges of glass components shall not be sharp. They shall withstand the various stresses to which they are subjected during the tests described in this European Standard without damage. In particular they shall withstand the tests described in 6.5.1.3.1 (when they are a part of the appliance) and in 6.5.1.3.2.

5.5.2 Stability

If the appliance is fitted with a foldable support, it shall be possible to lock this in the position of use (for example: stop, locking device).

If the radiant device of a barbecue or a grill can have several positions, a stop shall be provided for each of them.

The stability of an appliance designed to rest on a table or on the ground shall allow safe use on level ground. In addition, the appliance shall not tilt or fall over when it is placed on a slope of 10° and any lid shall not close.

This requirement shall also be met when the appliance is fitted with optional parts (for example: lamp extension posts).

These requirements shall be met under the test conditions described in 6.5.2.

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, flat-faced joints, O-rings or gaskets), i.e. excluding the use of any product which ensures soundness in the threads. For parts that do not require to be dismantled during normal maintenance, for example taps, the use of thread sealing compounds is permitted.

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

Soft solder (see definition in 3.8) 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. Conformity shall be verified based on the manufacturer's specifications.

Under the test conditions defined in 6.6.1, during each of the tests no. 1 and 2, the leak shall not exceed 0,07 l/h (1 013 mbar, 20 °C). This requirement shall also be met after all the tests on the appliance have been carried out, but before any dismantling of parts subjected to the soundness tests.

5.7 Connections

5.7.1 General

Whatever the type of gas container (pierceable cartridge, cartridge fitted with a valve, cartridge with or without centre boss, refillable reservoir...), when following the instructions, connection of the appliance to the gas container shall be easy with minimal, if any, gas leakage.

For appliances with direct rigid connection to the gas container(s), the CE Type Examination technical file for the appliance shall include diagrams and specifications of the gas containers (including their gas outlet connections) intended for the gas supply to the appliance.

5.7.2 Appliances directly fitted to the gas container

5.7.2.1 Appliances fitted to pierceable cartridges

a) design/construction of the appliance shall be such that there is no foreseeable replacement procedure sequence possible which can lead to an unsafe and/or unintended piercing of the cartridge by the user.

   (See in Annex C examples of authorized solutions);

b) The cartridge holder and the piercing device shall be such that:

   1) the piercing is centred in the position provided;

   2) soundness is ensured before piercing;

3) after the fitting of the cartridge, it shall not be possible to remove it, instantaneously and unintentionally, without first having to remove the piercing device.

Diagrams showing the correct sequence for the fitting of the cartridge to the appliance shall be marked on the appliance.

5.7.2.2 Appliances fixed onto cartridges with female valve and threaded centre boss as defined in EN 417 (see Figure 1)

5.7.2.2.1 The female thread of the adaptor (Figure 2) designed to be fixed onto the thread of the centre boss valve is defined as follows:

— 7/16 in - 28 threads Unified Form Special - (see Figure 3);

— major diameter : 10,96 mm minimum;

— effective diameter : 10,66 mm to 10,75 mm;

— minor diameter : 10,20 mm to 10,27 mm.

5.7.2.2.2 The part of the adaptor, with a full thread, shall be 3,10 mm $\pm$ 0,1 mm long (see Figure 2 a)).

5.7.2.2.3 The thread shall penetrate fully into the seal groove without reduction in form.

5.7.2.2.4 A valve actuator shall be fixed on the axis of the adaptor in such a way that it allows the drawing off of gas from a full cartridge in accordance with 5.7.1. The valve actuator shall allow the release of gas from the cartridge when the appliance is screwed onto the valve with a minimum torque of 3 Nm.

5.7.2.2.5 The diameter of the valve actuator shall not exceed 2,20 mm if it is solid and shall be between 3,10 mm and 3,15 mm if it includes a gas way as indicated in Figure 2 b). The valve actuator shall be concentric with the "7/16 in - 28 unified form thread" subject to a tolerance of 0,15 mm (see Figures 2 a) and 2 b)).

5.7.2.2.6 At the point where the valve actuator comes into contact with the valve seat, the valve actuator diameter shall be at least 1,70 mm (see Figure 2 a)).

NOTE It is recommended that adaptor manufacturers contact manufacturers of cartridge valves to establish the preferred design (see Figure 2 b)). The valve actuator shown in Figure 2 b) comes in contact with the inner seal of the valve ensuring complete soundness when the cartridge is fitted.

5.7.2.2.7 A seal groove shall be machined at the bottom of the threaded part so as to centre and secure a seal (see Figure 2 a)). This seal shall come into contact with the valve centre boss. The seal and the seal groove shall be such that there is no visible and permanent distortion of the threaded centre boss when the appliance is screwed onto the valve with a torque of 12 Nm.

5.7.2.2.8 The length of the valve actuator shall be such that it does not penetrate into the valve for a distance exceeding 4,15 mm below the plane of the upper side of the centre boss (see Figure 4, dimension X) when the appliance is screwed onto the valve with a torque of 12 Nm.

5.7.2.2.9 The inlet of the adaptor prior to the thread shall be a maximum of 2,00 mm deep and have a diameter of between 11,0 mm and 12,0 mm. In addition, the inlet of the adaptor shall begin with a 1,0 mm $\times$ 45° chamfer (see Figure 2 a)).

5.7.2.2.10 The diameter of the adaptor which penetrates the valve seal groove shall not exceed 22,90 mm. This part shall not extend more than 3,5 mm from the start of the adaptor thread (see Figure 2 a)).

5.7.2.2.11 The diameter of the adaptor beyond the 3,5 mm distance as defined in 5.7.2.2.10 shall be at least 30,0 mm. It shall be designed so as to rest on the rolled edge of the outer rim when fixing the appliance onto its cartridge, and after the seal ensuring soundness has come in contact with the cartridge valve. If the appliance incorporates other parts at this point (for example: blowlamp handles, plastic mouldings), the requirements of 5.7.2.2.10 and 5.7.2.2.11 shall be met, when these parts are in position.

5.7.2.2.12 The requirements of 5.7.2.2 shall be verified under the test conditions given in 6.7.2.2.

5.7.3 Appliances connected to the gas container by a flexible hose

Appliances connected to the gas container by a flexible hose shall be supplied with the flexible hose fitted.

If clips are used, they shall be of the machine formed type. Screw clips are not permitted.

Connections shall allow the flexible hose to move freely without risk of coming into contact with a part of the appliance whose temperature rise exceeds 70 K during the test defined in 6.21 when fitted in accordance with the instructions.

After the application of a load to the flexible hose under the conditions defined in 6.6.2, no leak greater than 0,07 l/h (1 013 mbar, 20 °C) shall be recorded.

5.8 Transport, fixing and mobility devices

An appliance fitted with a device which, in accordance with the instructions, allows its transport and/or fixing (for example: handles) shall be capable of being carried and/or hung without causing permanent distortion of parts of the appliance. This requirement shall be verified under the test conditions defined in 6.8.

Wheels allowing the movement of the appliance shall be sufficiently strong to support the appliance and, if necessary, its full container, if this is specified in the instructions.

If the appliance has wheels, means shall be provided to prevent accidental movement during use.

5.9 Taps

5.9.1 General

Each burner shall be controlled by a tap or device allowing the opening and closing of its supply. For appliances incorporating only one burner, this closing device may be that of the gas container.

Taps shall incorporate two stops, one on the closed position and one at the end of travel.

Taps shall be so placed in such a way that their strength, their operation, their manipulation and their accessibility undergo no change from actions to which they are subjected in normal use.

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

5.9.2 Needle valves

It shall not be possible to unscrew the needle from the housing of needle valves when opening the valve. When closing, the pressure of the needle on its seat constitutes the stop.

Needle valves shall comply with the requirements given in Annex B.

5.10 Control handles

5.10.1 Construction

It shall be obvious which burner is controlled by each control handle.

They shall be so arranged relative to one another that the movement of one handle does not cause inadvertent movement of an adjacent one.

Control handles shall be so designed that they neither be fitted in the wrong position nor move by themselves.

If control handles operate by turning, the closing direction shall be clockwise.

5.10.2 Marking

5.10.2.1 Taps with marked positions (for example: plug type taps)

The closed, open and, if applicable, reduced rate positions shall be marked in a visible, legible and durable fashion.

The closed position shall be marked by a full disc or a circle at least 3 mm in diameter. It shall be the same for all the taps.

The identification of the closed position of each tap shall not give rise to any possibility of confusion with the identification of an open position.

For other positions, the following symbols may be used:

- Full rate position — Large flame 
- Reduced rate position — Small flame 
- Rate range — Triangle 

or

Scale 1 2 3 4

or

4 3 2 1

Other symbols, other than letters, are permitted provided that they give similar information clearly.

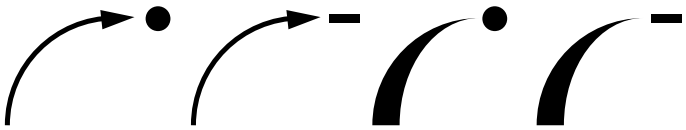
Additional markings are permitted provided that they do not create confusion for the appliance user.

The meaning of the symbols used shall be given in the instructions.

5.10.2.2 Taps with variable positions (for example: needle valves)

Markings placed either on the appliance or on the control handles shall be visible, legible and durable and comply with the following requirements:

a) the closing direction shall be marked by an arrow (possibly stylized) whose tip points to a full disc or circle at least 3 mm in diameter or the mark "-" symbolizing the closing position, for example:



b) marking of the reduced rate is not required.

Additional markings are permitted provided that they do not create confusion for the appliances user;

c) the meaning of the symbols used shall be given in the instructions.

5.11 Injectors

The gas rate shall be controlled by a calibrated injector.

Removable injectors shall carry an indelible marking allowing their identification, which shall be given in the instructions.

5.12 Ignition devices

When an ignition device is fitted, it shall be designed and constructed in such a way that it provides rapid and safe ignition.

The components of the ignition device shall be designed to avoid damage and displacement during use. The relative positions of the ignition device and the burner shall be sufficiently well defined to ensure safe operation of the assembly.

5.13 Flame supervision devices

When the flame supervision device falls within the scope of EN 125, the requirements of that standard shall apply.

When flame supervision devices are fitted, they shall be designed in such a way that, in the case of the failure of any of the components indispensable to their performance, the supply of the gas to the burner and to the pilot controlled by the device is cut off automatically and can only be restored by manual operation. They shall be so mounted as to ensure satisfactory performance.

The appliance shall not incorporate any device that allows the flame supervision device to be overridden. During the ignition period, a brief passage of unlit gas is permitted under the conditions given in 6.13.

Heating appliances, other than those supplied by cartridges (having a maximum capacity of 1 l), shall be fitted with a flame supervision device.

Under the test conditions described in 6.13, the ignition delay time shall not exceed 20 s and the extinction delay time shall be less than 60 s.

5.14 Burners and radiant elements

Burners and radiant elements shall be designed in such a way that they cannot move inadvertently during use or movement of the appliance.

The parts of a burner or a radiant element which require cleaning shall be removable and their cleaning shall be easy unless this is possible without dismantling.

It shall not be possible to reassemble removable burner parts incorrectly and they shall not be interchangeable if, by design, they are not identical. This shall be carried out in accordance with the information given in the instructions.

It shall be possible to the user to check that the burners are alight.

Crosslighting devices shall have a fixed position relative to the burners that they control and shall not distort in normal use.

Under the test conditions defined in 6.6.3, there shall be no leak of gas in a flammable quantity at the joints of the assembly:

— of burners made up of several parts;

— of burners on the body of the appliance.

5.15 Grids

5.15.1 General

Grids shall be detachable. When their height can be adjusted in accordance with the instructions while the burner is alight, they shall be provided with a fixed, moveable or detachable handle.

5.15.2 Grid with a rigid useful area

In the useful area of the grid, the bars, if any, shall not be more than 2 cm apart.

The grid shall be capable of withstanding, without deterioration likely to impair its use, the load described in 6.15. Under this load, it shall remain stable on its supports.

5.16 Turnspit

Any turnspit shall be fitted with a fixed or detachable handle. This requirement is considered to be satisfied if a motor forming a handle is used. The useful length of the handle shall be at least 80 mm.

When the distance between the support points of the turnspit is greater than 800 mm, there shall be a second handle, unless the motor can be used as a second handle.

In order to hold the food to be grilled, the turnspit shall be fitted with one or several adjustable, lockable devices.

When the turnspit is loaded as described in 6.16, it shall be stable on its supports.

5.17 Fireguards for heating appliances

Heating appliances shall be fitted with a guard meeting the strength and dimensional requirements indicated in a) and b):

a) strength of fireguards:

1) probe test.

It shall not be possible to touch any burner radiant, catalytic panel or a flame with any part of the test probe cone illustrated in Figure 8, even after the application of the test weight described in 6.17.1.1;

2) pull test.

The guard shall not be removed, displaced or permanently distorted when tested as described in 6.17.1.2;

3) glass fronted appliances.

When the design of the guard includes glass or similar material this material shall not be damaged by the impact test described in 6.17.1.3;

b) dimensions.

No opening in the guard or between the guard and the aperture to be protected, shall have dimensions exceeding:

— length 150 mm;

— width 35 mm;

— diagonal 154 mm.

Where a part of the fireguard comes within 3 mm of the aperture to be protected it shall be considered that the part reaches the edge of the aperture to be protected.

These dimensions are subject to the following exceptions:

1) where it is not possible to pass a 12 mm diameter probe having a hemispherical end through any opening between the guard and the aperture to be protected. The probe shall be applied with a force of 5 N to the guard, the weight of the probe being taken into account;

2) where the gap between any vertical rods does not exceed 5 mm.

5.18 Locations and compartments for refillable gas containers

5.18.1 Compartments for refillable gas containers

If the appliance has a compartment for a refillable gas container, this compartment shall be designed in such a way that:

a) effective ventilation is provided by openings in its base and upper section. The total area of the openings in the upper section shall be at least equal to 1 % of the base area of the compartment and the total area of the openings at the base at least equal to 2 % of the base area of the compartment;

b) the support for the gas container has sufficient mechanical strength to resist permanent distortion under the load of a full gas container;

c) the gas container can be easily inserted in, or removed from, the appliance and when it is in place it shall be vertical;

d) the gas container valve, if any, is readily accessible and remains easy to manipulate when the gas container is in place;

e) when the appliance may be connected by a flexible hose, of the length indicated in the instructions, the hose shall not come into contact with sharp edges.

5.18.2 Locations for a refillable gas container

When the appliance has an area designed to support a refillable gas container, it shall incorporate a device allowing the safe fixing of the container onto the appliance and the requirements in 5.18.1 b) to 5.18.1 e) shall apply.

5.19 Verification of the heat inputs

Under the test conditions defined in 6.19, each of the burners, supplied separately, shall be capable of giving the nominal heat input stated by the manufacturer with a tolerance as illustrated in Figure 5.

5.20 Resistance to overheating

No deterioration which could impair the safety of the appliance shall be evident after the test described in 6.20.

5.21 Temperature of various parts of the appliance

5.21.1 Floor standing appliances

Under the test conditions defined in 6.21.2.1, the surface temperatures of the various parts of the appliance specified below shall not exceed the following limits:

a) the surface temperature of the parts likely to be touched during normal use (for example: tap handles), measured only in the gripping area, shall not exceed the ambient temperature by more than:

   — 35 K for metals or equivalent materials;

   — 45 K for porcelain or equivalent materials;

   — 60 K for plastics, wood or equivalent materials.

   For turnspit handles and the handles fixed on the sides of barbecue covers, this requirement applies to a 50 mm length measured from the end of the handles.

   For barbecue front cover handles, this requirement applies for areas more than 50 mm from fixing points. If the temperature exceeds the permitted limit, the following warning shall appear on the handle: "Hot handle - Use gloves to touch";

b) the surface temperature of any gas container valve handle shall not exceed the ambient temperature by more than 35 K;

c) the surface temperature of connections (for example: nozzles) in contact with the flexible hose shall not exceed the ambient temperature by more than 30 K.

   The temperature of appliance parts likely to come in contact with the flexible hose, when fitted in accordance with the instructions, shall not exceed the ambient temperature by more than 70 K;

d) the surface temperature of auxiliary equipment shall not exceed the temperature stated by the manufacturer;

e) temperatures measured on accessible surfaces of the front and side panels of the appliance shall not exceed the ambient temperature by more than:

— metal and painted metal : 60 K;

— enamelled metal : 65 K;

— glass and porcelain : 80 K;

— plastics and wood : 100 K.

This requirement does not apply to barbecues or heating appliances.

5.21.2 Tools designed to be held during use

Under the test conditions defined in 6.21.2.2, the surface temperatures of the various parts of the appliance shall not exceed the following limits:

— those indicated in 5.21.1;

— 25 K for handles held during use.

5.22 Temperature of panels (floors, walls or ceilings)

5.22.1 Floor standing appliances

Under the test conditions defined in 6.22.1, the temperature of panels shall not exceed the ambient temperature by more than 70 K for floors and 50 K for walls.

5.22.2 Appliances intended for suspension

If the instructions allow the use of the appliance when it is suspended from a ceiling or wall (for example: a lamp), the rise in temperature of the panel used as the ceiling or wall, as appropriate, shall not exceed the ambient temperature by more than 50 K.

5.23 Ignition, crosslighting and flame stability

Under the test conditions defined in 6.23:

— ignition, crosslighting and re-ignition shall occur smoothly within 5 s;

— 60 s after ignition, flames shall be stable. A tendency to lift is permitted at maximum test pressures;

— there shall be no extinction or light back;

— the gas supplying burners which are not protected by a flame supervision device shall light automatically and smoothly if a burner is already operating within the same enclosure.

5.24 Resistance to draught

Under the conditions defined in 6.24, neither burners nor pilots shall be extinguished.

This test shall not be carried out on burners fitted with a flame supervision device.

5.25 Resistance to liquid spillage

Under the conditions defined in 6.25, neither burners nor pilots shall be extinguished, unless this is caused by the action of a flame supervision device.

5.26 Combustion

Under the conditions defined in 6.26, the quantity of CO in the air and water vapour free products of combustion shall not exceed 0,2 %.

5.27 Accumulation of un-burnt gas

Any enclosure[1)] containing at least one burner shall have one or several openings in its lower part allowing the discharge of un-burnt gas which might be released by the burners.

These openings shall not be obstructed when the appliance is in the position of normal use (for example: appliances operating when they are placed on a surface).

5.28 Safety at high temperature

During the test described in 6.28, the pressure inside the gas container shall not exceed the pressure of the gas contained at 50 °C. After this test:

— there shall be no deterioration which could impair safe operation of the appliance;

— the appliance shall meet the requirements of 5.6;

— the ease of changing the gas container and of manipulating the controls shall not have changed.

5.29 Sooting - condensation

At the end of all the tests in this European Standard, no deposit of soot likely to impair safe operation of the appliance shall be observed.

During all the tests of this standard, condensation shall not create phenomena likely to impair safe operation of the appliance.

5.30 Rational use of energy

5.30.1 Efficiency of hotplate burners

The requirements given in 5.30.1.1 and 5.30.1.2 do not apply to hotplate burners whose nominal heat input is less than 1,16 kW.

5.30.1.1 Uncovered burners

The efficiency determined under the conditions defined in 6.30.1 shall not be less than 50 %.

This value is reduced to 45 % for hotplates for use with special pans having a pan diameter less than 150 mm.

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1) Burner in an enclosure: any burner enclosed or partially enclosed in the body of the appliance in such a way that un-burnt gas released by that burner can accumulate in the appliance.

5.30.1.2 Covered burners

The efficiency determined under the conditions defined in 6.30.2 shall not be less than:

— 25 % (from the cold condition);

— 35 % (from the hot condition).

6 Test methods

6.1 General

6.1.1 Test gases

The composition of the reference gases used for the tests shall be as near as possible to those given in the table below (reference conditions: dry gas at 15 °C and 1 013 mbar):

Table 1 — Characteristics of the test gases

Reference gas	Composition	Wobbe number (on H_S)	Gross calorific value (H_S)	Relative density to air
Reference (Gas A) butane	C_4H_{10}	87,33 MJ/m^3	49,47 MJ/kg	2,075
Reference (Gas B) propane	C_3H_8	76,84 MJ/m^3	50,37 MJ/kg	1,550
Reference (Gas C) propene	C_3H_6	72,86 MJ/m^3	48,94 MJ/kg	1,476

For the making up of these gases, the rules below shall be followed:

a) the Wobbe number of the gas used shall be within ± 2 % of the value indicated in the table above;

b) the gases used shall have the following minimum degrees of purity:

1) Butane C_4H_{10} 95 %
2) Propane C_3H_8 95 %
3) Propene C_3H_6 95 %

) $H_2 + CO + O_2 < 1$ %
) $N_2 + CO_2 < 2$ %

6.1.2 Test conditions

The tests shall be carried out at an ambient temperature of (20 ± 5) °C, unless otherwise stated in the specific test conditions or when a higher temperature is required in order to obtain the required test pressure.

For appliances whose instructions do not allow operation with the lid closed, the tests shall be carried out with the lid open, unless otherwise stated in the test method.

For appliances fitted with a user operated aeration adjuster, the tests shall be carried out with the aeration adjuster in the fully open position (unless otherwise stated in the test method).

6.1.3 Test gases and pressures

Depending on the appliance category, burners shall be tested with the gases under the pressure conditions given in Table 2.

Table 2 — Test conditions

Test	Clause	Butane appliances		Butane-propane mix appliances		Propane appliances	
		Test gas	Pressure (bar)	Test gas	Pressure (bar)	Test gas	Pressure (bar)
Soundness	6.6	Air	0,5 8,0	Air	0,5 12,0	Air	0,5 18,0
Rate and delay times	6.13 6.19	Gas A	1,0	Gas B	3,0	Gas B	7,0
Overheating	6.20	Gas A	0,5	Gas A Gas C	0,5 2,0	Gas C	3,0
Temperatures	6.21	with the gas container intended for the appliance					
Ignition	6.23	Gas A Gas B	0,5 2,0	Gas A Gas B	0,5 5,0	Gas C Gas B	3,0 9,5
Resistance to draught	6.24	Gas A Gas B	0,5 2,0	Gas A Gas B	0,5 5,0	Gas B Gas B	3,0 9,5
Resistance to spillage	6.25	Gas A	1,0	Gas B	3,0	Gas B	7,0
Combustion	6.26	Gas A Gas B	0,5 2,0	Gas A Gas B	0,5 5,0	Gas C Gas B	3,0 9,5
Safety at high temperature	6.28	with the gas container intended for the appliance					

6.2 Conversion to different gases

The requirements of 5.2 shall be verified by visual examination.

6.3 Materials

The requirements of 5.3 shall be verified by visual examination and by checking the information supplied by the manufacturer.

6.4 Assembly, cleaning and maintenance

The requirements of 5.4 shall be verified by visual examination and manipulation of the appliance.

6.5 Strength and stability

6.5.1 Strength

6.5.1.1 General

The requirements of 5.5.1.1 shall be verified by visual examination of the construction and manipulation of the appliance.

6.5.1.2 Hotplate pan supports

A load, whose mass expressed in kilograms, equal to the number of burners covered by the support multiplied by 5 is applied evenly on the pan support for 1 min.

The deformation shall be measured once the load has been removed.

The test shall be carried with the appliance at room temperature.

For hotplates that, by design, are only for use with a special vessel[2)] supplied with the appliance, the test shall be carried out with this vessel filled with water to within 10 mm of the top.

The requirements of 5.5.1.2 shall be met.

6.5.1.3 Glass components

6.5.1.3.1 Viewing panels

6.5.1.3.1.1 Resistance to mechanical shock

The appliance being at the temperature of the test room raise the lid to maximum opening, then allowed it to fall.

The test shall be repeated after 15 min operation with the appliance being supplied with the gases and pressures indicated in 6.19.1 all the taps being at the full rate position.

In neither case shall the glass panel show either breakage or changes after dropping the lid.

6.5.1.3.1.2 Resistance to thermal shock

The appliance is operated with the gases and at the pressures indicated in 6.19.1 for 15 min, the control handle being in the full rate position (all the burners operating simultaneously if the appliance incorporates more than one burner). 50 ml of water is poured above the mid-line of the panel, across the full width using the device in Figure 6.

The water may be contained in a distortable vessel which allows spraying of the water onto the glass panel (vertical surface) by pressure.

The test shall not be carried out if the glass panel is not subjected to thermal stress during normal use of the appliance (for example, appliance with a glass panel in a lid, whose instructions for use prohibit operation with the lid closed).

6.5.1.3.2 Lamp globes

Five globes shall be placed in an oven until they reach thermal equilibrium at 150 °C.

They shall then be quickly immersed in a tub of water at (20 ± 5) °C.

No more than one globe shall break. If one globe breaks, the test shall be repeated on five new globes and none shall break.

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2) The vessel is "special" if the appliance pan support is designed to receive a vessel with a diameter only slightly larger than that supplied with the appliance.

6.5.2 Stability

6.5.2.1 General

If the appliance is supplied with a stabilizer this shall be fitted before the tests, if the instructions require its use.

For the tests, the gas containers recommended by the manufacturer shall be placed as specified in the instructions and any appliance lid shall be open.

6.5.2.2 Stability on an inclined plane

The appliance, connected to an empty gas container, is placed on a slope of 10° to the horizontal.

Check that (see 5.5.2):

— the appliance does not tilt or fall over;

— any lid does not close;

— the gas containers recommended by the manufacturer do not tilt or fall over in the various positions or configurations of use indicated in the instructions.

The use of a wedge is permitted to avoid the appliance sliding.

6.5.2.3 Stability on a horizontal plane

a) hotplates.

The hotplate, connected to an empty gas container, is placed on a horizontal plane. Vessels with diameters from 120 mm to 180 mm, complying with Annex B, filled with water to a height of 40 mm, are centred on the pan support, then off set by 15 mm. Neither the hotplate nor the vessel shall tilt or fall over during the test (see 5.5.2).

For hotplates for use with special vessels as defined in 6.5.1.2, the test shall be carried out by moving the vessel, filled with water up to 10 mm from the top, off set as far as possible;

b) barbecues.

The appliance, connected to an empty gas container, is placed on a horizontal plane, check that:

1) the positioning and the removal of the cooking devices;

2) the change of the position of the radiant device, if this exists;

3) the positioning and the removal of the gas container;

can be carried out (see 5.5.2) without:

— the appliance tilting or falling over;

— any of the components detaching or moving in such a way that safety is impaired.

For appliances rigidly fixed onto the gas container, the same checks, with the exception of 3), shall be carried out.

6.6 Soundness of the gas circuit assembly

6.6.1 Soundness of the appliance

The requirements of 5.6 relating to construction are checked by visual examination and those concerning soundness are checked as follows:

— test No. 1: with all taps or shut-off devices closed;

— test No. 2: with all taps in the "on" position, the injectors of burners and pilots being temporarily blocked and any shut-off devices, for example the valves of safety devices, where present, in the open position.

The tests shall be carried out using air. The pressure at the inlet of the appliance being:

— 0,5 bar and 8 bar for appliances burning butane;

— 0,5 bar and 12 bar for appliances burning a butane/propane mix;

— 0,5 bar and 18 bar for appliances burning propane.

The appliance shall be connected to a compressed air supply in the same way as to its supply gas container.

Any leak shall not exceed the limit given in 5.6.

The method used for measuring shall be such that error made in the measurement of the leak is less than 0,01 l/h.

6.6.2 Soundness of flexible tube connections

The appliance is supplied with air at the pressures stated in 6.6.1, a force of 150 N is applied for 1 min along the axis of the tube. The test shall be repeated for each end of the flexible tube.

Any leak shall not exceed the limit given in 5.7.3.

6.6.3 Soundness of burner assemblies

The appliance is operated with gas B under the following conditions:

— 2 bar for appliances burning butane;

— 5 bar for appliances burning a butane/propane mix;

— 9,5 bar for appliances burning propane.

A flame is presented to the burner assembly joints as indicated in 5.14 and it is checked that there is no leak in a flammable quantity.

6.7 Connections

6.7.1 General

The general requirements of 5.7.1 shall be verified by visual examination and manipulation of the appliance with its gas container.

In addition, for appliances with direct, rigid connection to gas containers, the test results shall be compatible with the dimensional and operational information given in the drawings and specifications for gas containers and their connections.

6.7.2 Appliances directly connected to gas containers

6.7.2.1 Appliances fixed onto pierceable cartridges

The requirements of 5.7.2.1 shall be verified by visual examination and manipulation of the appliance with its gas container.

6.7.2.2 Appliances fixed onto female valve cartridges with a threaded centre boss

6.7.2.2.1 General

The general requirements of 5.7.2.2 shall be verified by visual examination, dimensional verification and manipulation of the appliance with its gas container.

6.7.2.2.2 Valve opening

The appliance is screwed onto the cartridge supplied with it with a torque of 3 Nm. Check that the valve actuator opens the cartridge valve and that gas supplies the burner as required by 5.7.2.2.4.

6.7.2.2.3 Resistance to tightening torque

The test shall be carried out on samples of female valves with a threaded centre boss similar to those fixed onto the cartridges which have been supplied by the manufacturer of the appliance.

The valve shall be held tight by the clamp illustrated in Figure 7 so as to avoid rotation.

The appliance adaptor shall be tightened until a torque of 12 Nm is obtained at a speed less than 1 Nm/s.

The appliance adaptor shall then be unscrewed and the requirements of 5.7.2.2.7 shall be met.

6.7.2.2.4 Maximum opening of the valve

The dimensions A and B shown in Figure 4 a) shall be measured on a sample of female valve with threaded centre boss and recorded.

The valve measured shall be fixed on the clamp (see Figure 7), which is held so as to avoid rotation of the valve.

The appliance adaptor shall be screwed until a torque of 12 Nm is obtained for a speed less than 1 Nm/s.

The clamp shall then be loosened and the valve-adaptor assembly removed from the clamp.

The dimension C (Figure 4 b)) shall be measured and the dimension X (see 5.7.2.2.8) shall be calculated using the equation $X = (A + B) - C$.

X shall not be greater than 4,15 mm.

NOTE This test is carried out on a valve that has not been fixed onto a cartridge. Consequently the valve centre boss will be pulled upwards in the appliance adaptor during the test, this is due to the abnormal tightening torque applied to the valve during the test. This raising of the centre boss during the test is not taken into account.

6.8 Transport, fixing and mobility devices

The verification of the requirements of 5.8 shall be carried out as follows:

a) transport devices.

The appliance shall be lifted by hand and held for 15 s. If the instructions allow the transport of the appliance fitted onto its gas container the test shall be carried out, under these conditions, the gas container being full;

b) fixing devices.

The appliance shall be suspended for 15 s as specified in the instructions. If the instructions allow the operation of the appliance suspended, the test shall be carried out with the appliance fitted to a full gas container;

c) mobility devices.

The verification of the requirements of 5.8 shall be carried out by visual examination and by moving the appliance.

6.9 Taps

The requirements of 5.9 shall be verified by visual examination, manipulation of the taps and tests in accordance with Annex B.

6.10 Control handles

The requirements of 5.10 shall be verified by visual examination, manipulation of the handles and reading the instructions.

6.11 Injectors

The requirements of 5.11 shall be verified by visual examination.

6.12 Ignition devices

The requirements of 5.12 shall be verified by visual examination.

6.13 Flame supervision devices

The tests designed to verify the ignition and extinction delay times defined in 5.13 shall be carried out under the following conditions:

6.13.1 Ignition delay time

The appliance shall be supplied with gas at the pressure specified in 6.19.1.

The taps shall be in the full rate position or in the ignition position indicated in the instructions.

Burners shall not be covered by vessels.

Lids shall be open.

At the start of the test the appliance shall be at ambient temperature.

The ignition delay time is the time between the ignition of gas at the pilot or at the burner and the moment when the flame supervision device allows the gas to supply the burner.

6.13.2 Extinction delay time

The appliance shall be supplied with gas at the pressure specified in 6.19.1.

The taps shall be in the full rate position.

The burner under test shall be covered with a 180 mm diameter vessel filled with 2 kg of water[3)].

Lids shall be closed if the instructions allow operation in this configuration.

The test shall start after 15 min operation.

The extinction delay time is measured between the moment the supervised burner is voluntarily extinguished by shutting off the gas supply and the moment when, after immediate restoration of this supply, the flow of gas ceases through the action of the flame supervision device.

6.14 Burners and radiant elements

The requirements of 5.14 shall be verified by visual examination and manipulation of the appliance.

6.15 Grids

The requirements of 5.15 shall be verified by visual examination and dimensional checks. In order to verify the requirements of 5.15.2, the grid is covered with an evenly distributed load of 0,5 kg/dm^2 of useful area.

6.16 Turnspit

The requirements of 5.16 shall be verified by visual examination and dimensional checks. The stability of the turnspit shall be verified when a load of 0,5 kg/100 mm of useful length is applied.

6.17 Fireguards for heating appliances

6.17.1 Strength of fireguards

6.17.1.1 Probe test

The test shall start after 15 min operation with all taps fully open, the appliance being supplied with the gas at the pressure indicated in 6.19.1. The test probe cone described in Figure 8 is applied to the guard openings with a force of 5 N.

The appliance is then allowed to cool to the ambient temperature of the test room. The appliance is placed so that the central section of the guard is horizontal. A flat disc 100 mm in diameter and 5 kg in mass is placed on the guard midway between the fixing points for 1 min and then removed.

The appliance is then reheated as previously and the cone described in Figure 8 is reapplied to the guard.

The requirements of 5.17 a) 1) shall be met.

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3) See 6.5.1.2 for appliances with special vessels.

6.17.1.2 Pull test

A pull of 20 N shall be applied at any point and in any direction to the guard.

The requirements of 5.17 a) 2) shall be met.

6.17.1.3 Appliances with a glass panel

A direct blow having an impact energy of 0,5 N is applied to any point on the glass. The blow may be conveniently applied by means of the spring hammer described in Figure 12 of EN 60335-1:2002.

The requirements of 5.17 a) 3) shall be met.

6.17.2 Dimensions

The requirements of 5.17 b) shall be verified by visual examination and dimensional checks.

6.18 Locations and compartments for refillable gas containers

The requirements of 5.18 shall be verified by visual examination, dimensional checks and manipulation of the appliance.

6.19 Verification of heat inputs

6.19.1 Test

The verification of the nominal heat input shall be carried out with the appliance operating under the following conditions:

— gas A at 1 bar for appliances burning butane;

— gas B at 3 bar for appliances burning a butane-propane mix;

— gas B at 7 bar for appliances burning propane.

The test shall start when the burner under test has been operating for 15 min, with fully open taps, without a vessel on the burner and any lid open.

Measurements shall be made under these operating conditions during the subsequent 15 min.

The tolerance on heat inputs indicated in Figure 5 shall be satisfied.

6.19.2 Calculation of heat inputs

The nominal input D_N in kW is given by the following expression:

$$D_N = 0{,}278\ M_N \times H_S$$

where

M_N is the nominal mass rate in kg/h obtained under reference conditions;

H_S is the gross calorific value in MJ/kg of the reference gas indicated in 6.1.1.

The mass rate corresponds to measurements and a flow of reference gas under reference conditions, that is the gas is assumed dry at 15 °C at a pressure of 1 013 mbar. In practice, the values obtained during the tests do not correspond to these reference conditions, they shall then be corrected so as to bring them to the values which would have been obtained if these reference conditions had existed during the tests at the outlet of the injector.

The corrected mass rate is calculated using the following equation:

$$\frac{M_0}{M} = \sqrt{\frac{1013+p}{p_a+p} \times \frac{273+t_g}{288} \times \frac{d_r}{d}}$$

where

M_0 is the mass gas rate under reference conditions, expressed in kg/h;

M is the mass rate under test conditions, expressed in kg/h;

p_a is the atmospheric pressure in mbar;

p is the gas supply pressure in mbar;

t_g is the temperature of the gas at the measuring point in °C;

d is the density of dry gas relative to dry air;

d_r is the density of the dry reference gas relative to dry air.

These equations shall be used to calculate, from the mass rate M measured during the test, the corresponding rate M_0 that would have been obtained under reference conditions.

The value M_0 shall be compared with the value M_N calculated from the nominal calorific value using the formula at the beginning of this subclause.

6.20 Resistance to overheating

The burner under test shall be supplied under the following conditions:

— gas A at 1 bar for appliances burning butane;

— gas A at 1 bar and gas C at 3 bar for appliances burning a butane-propane mix;

— gas C at 7 bar for appliances burning propane.

The maximum heat input at which the gas can burn at the injector or inside the burner is established, using the following method:

a) hotplate burners are covered by a vessel of 180 mm diameter filled with 2 kg of water[4)].

b) any appliance lids are open;

c) the gas is lit at the injector and, in addition, if possible, at the burner head;

4) See 6.5.1.2 for appliances with special vessels.

d) if combustion cannot be maintained at the injector or inside the burner, the test continues:

   1) by reducing the pressure until combustion can be maintained, but stopping at the following minimum pressures:

      — gas A at 0,5 bar for appliances burning butane;

      — gas A at 0,5 bar and gas C at 2 bar for appliances burning a butane-propane mix;

      — gas C at 3 bar for appliances burning propane;

   2) then, if necessary, by reducing the rate using the taps to the point where combustion can be maintained;

e) the test continues with the flame left in these conditions for 15 min, after this period the requirements of 5.20 shall be met.

6.21 Temperatures of the various parts of the appliance

6.21.1 Test installation

The test installation consists of a horizontal panel and of a vertical panel. These 25 mm thick wooden panels are coated with black matt paint on the surface facing the appliance.

Thermocouples are incorporated in the panels at the centres of 10 cm squares, which penetrate the panel from the outside so that the junctions are situated 3 mm from the surface facing the appliance.

6.21.2 Test method

6.21.2.1 Floor standing appliances

The appliance rests on the support, the distance between the appliance and the vertical panel being the minimum distance indicated in the instructions.

The appliance operates for 1 h (possibly changing the gas container when it is empty) under the following conditions:

— a full gas container designed to be used with the appliance is fixed onto it, at the start of the test;

— all the taps are open in the full rate position;

— hotplate burners are covered with a 180 mm diameter vessel filled with 2 kg of water[5)];

— any lid is closed if the instructions allow this mode of operation;

— transport handles which fold downwards are placed in this position;

— any grill is lit 15 min before the end of tests, at full rate, any grill-pan being in place;

— aeration adjusters shall be in the full open position.

Measure the rise in temperature reached during the test on the surfaces indicated in 5.21.1 and check that they do not exceed the limits fixed.

5) See 6.5.1.2 for appliances with special vessels.

The temperatures of glass or enamelled surfaces shall be measured with a probe complying with that defined in EN 30-1-1.

Measurements on accessible front panels and side panels shall not be carried out on areas:

— which are not accessible to a 75 mm diameter test probe having a hemispherical end;

— which, on a hotplate, are less than 25 mm below, or are above the hob. This principle applies to various types of appliances, for example measuring temperatures on surfaces more than 25 mm away from the upper side of parts containing or holding the cartridge;

— of small dimensions, such as ventilation grilles or outlets for the products of combustion, flues and gaskets whose width of accessible surface is less than 10 mm.

In addition, a measurement on a surface less than 1 cm^2 shall not be taken into account.

6.21.2.2 Tools intended to be held during use

The appliance is held 50 cm from the support in such a way that the axis of the flame is horizontal. It shall operate for 1 h under the conditions specified in 6.21.2.1.

Measure the maximum rise in temperature reached during the test on surfaces as indicated in 5.21.2 and check that they do not exceed the limits fixed.

6.22 Temperature of panels (floor, wall or ceiling)

6.22.1 Floor standing appliances

The appliance shall be tested under the conditions defined in 6.21.2.1.

Measure the maximum rise in temperature reached during the test on panels (floor, wall) and check that they do not exceed the limits fixed in 5.22.1.

6.22.2 Fixed appliances

If the appliance is designed to be used hung from a ceiling, it shall be hung from a ceiling made of a panel similar to those described in 6.21.1, at the minimum distance indicated in the instructions.

If the appliance is designed to be hung by its handle from a wall, it shall be hung to a wall made of a panel similar to those described in 6.2.1.1, in accordance with the instructions. The appliance shall be operated for 1 h under the conditions defined in 6.21.2.1 (except for the positioning of the handle).

Measure the maximum rise in temperature reached during the test on the ceiling and/or the wall, depending on the case, and check that they do not exceed the limits fixed in 5.22.2.

6.23 Ignition, crosslighting and flame stability

6.23.1 Test conditions

Burners shall be supplied under the following conditions:

— appliances burning butane : gas A at 0,5 bar and gas B at 2 bar;

— appliances burning a butane- propane mix : gas A at 0,5 bar and gas B at 5 bar;

— appliances burning propane : gas C at 3 bar and gas B at 9,5 bar.

6.23.2 Test on individual burners, others being extinguished

6.23.2.1 The burner under test being at the ambient temperature of the test room, the tap is opened and turned to the full rate position or to the ignition position indicated in the instructions.

The burner is lit with a match or with the ignition device, if such exists.

When the ignition device supplies only one spark at a time, it is operated so as to obtain one spark a second.

The first operation shall take place when the gas reaches the burner ports.

The test shall be carried out firstly without a vessel on the burners, and then, for uncovered burners, with a 180 mm diameter filled with 2 kg of water[6)].

The test shall be carried out with any lid open, and then lid closed if the instructions allow this mode of operation.

For appliances fitted with a primary aeration adjuster the test shall be carried out with the air adjuster fully open.

Correct ignition and crosslighting of the burner shall be checked after 5 s operation.

Flame stability shall be verified after 60 s operation.

6.23.2.2 After examination of the flame, check that there is neither extinction nor light back when:

— the appliance is supplied at minimum pressure, with the tap fully open (fully open aeration adjuster);

— the appliance is supplied at maximum pressure, the tap turned from the full rate position to that of the reduced rate in approximately 1 s (aeration adjuster open then closed). For this test, the reduced rate for needle type taps is defined as being equal to half the nominal rate.

6.23.2.3 After checking that there is neither extinction nor light back, leave the burner to operate for 5 min, then switch it off and carry out a re-ignition test under the same test conditions as those for ignition.

Check that ignition and crosslighting take place within 5 s and that flames are stable after 60 s operation.

6.23.3 Test on individual burners, others being lit

The tests described in 6.23.2 shall be repeated on each burner whilst the other burners operate without vessels and with their taps fully open.

In addition, check that crosslighting between burners within a common enclosure which are not protected by flame supervision devices is smooth. The checks are made when:

— the taps of the new burner to be lit are in the full rate position (or in the ignition position specified in the instructions);

— the taps of the burner(s) already lit are in the full rate position or in the ignition position(s) specified in the instructions;

— the burner(s) already lit have been operating for 60 s.

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6) See 6.5.1.2 for appliances with special vessels.

6.24 Resistance to draught

6.24.1 The tap corresponding to the burner under test shall be in the full rate position and the appliance shall be supplied under the following conditions:

— appliances burning butane : gas A at 0,5 bar and gas B at 2 bar;

— appliances burning a butane- propane mix : gas A at 0,5 bar and gas B at 5 bar;

— appliances burning propane : gas B at 3 bar and 9,5 bar.

Each burner is tested individually, the other burners being extinguished. Hotplate burners are covered by a 180 mm diameter vessel[7)]. Appliance lids are open. Aeration adjusters shall be in the fully open position.

After 15 min operation, a substantially laminar draught of 3 m/s is directed horizontally towards the appliance at the burner height. The draught is interrupted so as to produce 5 gusts of 10 s with 10 s intervals between them. Tests are repeated for successive rotations of 45° in the horizontal plane round the appliance.

In all configurations the requirements of 5.24 shall be met.

6.24.2 For appliances intended to be held (for example: blow lamps) or which incorporate an aeration adjuster which is adjustable by the user, the draught shall be perpendicular to the flame axis. In addition, the test pressures and gases given in 6.24.1 are replaced by the following:

— appliances burning butane : gas A at 1 bar and gas B at 2 bar;

— appliances burning a butane- propane mix : gas B at 3 bar and 5 bar;

— appliances burning propane : gas B at 7 bar and 9,5 bar.

In all configurations the requirement of 5.24 shall be met.

6.25 Resistance to liquid spillage

Hotplate burners are operated, with taps fully open under the following conditions:

— appliances burning butane : gas A at 1 bar;

— appliances burning a butane-propane mix : gas B at 3 bar;

— appliances burning propane : gas B at 7 bar.

They are used to bring to and keep boiling a 180 mm diameter vessel, not covered by a lid[8)], filled with water to a height of 10 mm from the top. The test continues until there is no spillage. The requirement of 5.25 shall be met. Partial extinction of the burners is permitted provided that there is automatic re-ignition.

7) See 6.5.1.2 for appliances with special vessels.

8) See 6.5.1.2 for appliances with special vessels.

6.26 Combustion

6.26.1 General conditions

The tap corresponding to the burner under test shall be in the full rate position and the appliance shall be supplied under the following conditions:

— appliances burning butane : gas A at 0,5 bar and gas B at 2 bar;

— appliances burning a butane-propane mix : gas A at 0,5 bar and gas B at 5 bar;

— appliances burning propane : gas C at 3 bar and gas B at 9,5 bar.

For each of these supply conditions, the tests shall be carried out with the burners operating individually, and then repeated with the other burners operating with their taps fully open.

The tests shall be carried out with any lid open or closed if the instructions allow this mode of operation. The tests shall be carried out with the aeration adjuster fully open for appliances fitted with a user adjustable aeration adjuster.

The products of combustion are sampled 15 min after the start of the test.

The quantity of CO_2 in the sample shall preferably be greater than 1 % (V/V).

The use of a restrictor is permitted so as to obtain such a quantity of CO_2. If it is impossible to obtain a quantity of 1 % CO_2, a concentration lower than 1 % may be accepted, but the laboratory shall ensure the reproducibility of the sample taken.

The requirements in 5.26 shall be met.

6.26.2 Hotplate burners

Hotplate burners under test are covered by a 180 mm diameter vessel filled with 2 kg of water[9)]. No vessel is placed on contact grills or covered burners.

When testing a single burner, the vessel is covered by a device complying with Figure 9.

When testing burners simultaneously, the appliance is covered with one of the devices complying with Figure 10, chosen according to the shape of the hotplate in such a way that the quality of combustion is not affected.

6.26.3 Analysis of the products of combustion

For all the tests carbon monoxide is measured with a selective method allowing a concentration of 0,005 % by volume to be detected accurately.

9) See 6.5.1.2 for appliances with special vessels.

The quantity of CO in the air and water vapour free products (neutral combustion) is given by the following equation:

$$\%\ (CO)_N = \%\ (CO_2)_N \times \frac{(CO)_M}{(CO_2)_M}$$

where

$\%\ (CO)_N$ is the percentage of CO in the dry, air free products of combustion;

$\%\ (CO_2)_N$ is the percentage of CO_2 calculated for the dry, air free products of combustion of the gas used (neutral combustion);

$(CO)_M$ & $(CO_2)_M$ are the carbon monoxide and carbon dioxide concentrations measured in the sample during the combustion test, both expressed in the same units.

The values in percent of $(CO_2)_N$ (products of neutral combustion) are 14,0 for gas A and 13,7 for gases B and C.

Carbon dioxide CO_2 is measured with a method allowing measurement with a relative error not exceeding 6 %.

6.27 Accumulation of un-burnt gases

The requirement of 5.27 is checked by visual examination.

6.28 Safety at high temperature

The appliance, connected to a full gas container, is placed in a properly ventilated room whose temperature is maintained at (35 ± 3) °C until it reaches thermal equilibrium. It is then lit with all taps in the full on position.

Hotplate burners are covered by a steel disc 180 mm in diameter and 2 mm in thickness (for the case described in 6.5.1.2, this disc is replaced by the vessel specific to the appliance, three quarters full of water, if this vessel has an external diameter less than 180 mm).

For lighting appliances, mantles are pierced with 5 mm diameter hole. This hole shall be placed so that the flame coming from it is directed towards parts which could be damaged or cause maximum overheating.

Any lid is closed if the instructions allow this mode of operation.

A pressure recording device is connected either to the gas container or to the appliance gas circuit situated between the gas inlet and the gas closing point of the tap. The capacity of the connection circuit shall be low.

The pressure inside the gas container is measured for 30 min, to ensure that it does not exceed the pressure of the gas contained at 50 °C.

NOTE The pressure of gas at 50 °C inside the gas container is measured before the test, when the container is full, for example by maintaining it in a bath of hot water until thermal equilibrium is reached at 50 °C.

Allow the appliance to cool and check for deterioration of the appliance and cartridge, then fit a new gas container and light the burners.

The appliance is then subjected to the soundness test described in 6.6.1.

The requirement of 5.28 shall be met.

6.29 Sooting - condensation

The requirements of 5.29 shall be checked by visual examination.

6.30 Rational use of energy

6.30.1 Uncovered hotplate burners

Each burner is supplied with the gas at the pressures indicated in 6.19.1, the tap being fully open.

Aluminium vessels [10)] with matt bases, smooth sides, with no handle and in accordance with the characteristics of Annex A are used. The vessels are covered by their lids.

Depending on the nominal heat input of the burner under test, the vessel diameter to be used and the quantity of water which it contains are given in the table below; the heat input may need to be adjusted so as to take into account the information given in this table.

Table 3 — Vessel diameter and mass of water relative to the burner heat input

Nominal heat input of the burner (kW)	Internal diameter of the vessel (mm)	Mass of water *M* ' to be used (kg)
between 1,16 and 1,64	220	3,7
between 1,65 and 1,98	240	4,8
between 1,99 and 2,36	260 [a]	6,1
between 2,37 and 4,2	260 [a] with the burner heat input adjusted to 2,36 kW	6,1
[a] If the 260 mm diameter vessel does not allow the test to be carried out under normal conditions of use of the appliance, the test shall be carried out with a 240 mm diameter vessel and the heat input of the burner shall be adjusted to 1,98 kW.		

The water temperature at the beginning of the test shall be (20 ± 1) °C and the temperature when the burner is extinguished (90 ± 1) °C.

The maximum temperature after the extinction of the burner shall be observed (final temperature).

A measuring device is placed in the centre of the volume of water, and the temperature is measured using a sensor whose measurement uncertainty is less than 0,5 °C.

The burner, covered by a 220 mm diameter vessel containing 3,7 kg of water, operates for ten minutes at nominal rate. The 220 mm vessel is removed and immediately the vessel used for the efficiency test is placed on the burner. The measurement of gas consumption begins then and it ends after the burner's extinction, the vessel remaining in place.

The efficiency is calculated from the equation:

$$\eta = M_e C_p \frac{(t_2 - t_1)}{M \quad H_S} \times 100$$

10) For appliances with special vessels (see 6.5.1.2), the test is carried out with the special vessel filled with water to within 10 mm of the top for this test.

where

η is the efficiency in percent;

M_e is the water equivalent of the vessel filled as indicated in the table above;

The mass M_e is made up as follows:

$M_e = M' + 0{,}213\ m$

where

M' is the volume of water put into the vessel;

m is the mass of aluminium corresponding to the test vessel covered by its lid (the mass m to be taken into account shall be the mass measured);

All masses are expressed in kilograms:

t_1 is the water temperature in °C at the start of the test;

t_2 is the maximum water temperature in °C after extinction;

M is the mass of gas burnt in kg (under the reference conditions of the gross calorific value);

H_S is the gross calorific value of gas in MJ/kg;

C_p $= 4{,}186\ 8 \times 10^{-3}$ MJ/kg/°C.

The requirements defined in 5.30.1.1 shall be met.

6.30.2 Covered burners

Each burner is supplied with the gas at the pressure indicated in 6.19.1, the tap being fully open.

Efficiencies, from the cold condition and from the hot condition, with any plates and rings being in place, are measured under the following conditions:

— the vessel corresponding to the burner under test, see Table 3, in the most suitable position is placed on the hotplate;

— the smallest number of vessels chosen from Annex A with the largest possible diameter are placed on the remaining surface of the plate.

The temperature is measured in the same way as for an uncovered burner: the start temperature of the water being (20 ± 1) °C, the final temperature is for each vessel the highest temperature observed after the burner extinction, this being carried out once the temperature of the water in any of the vessels reaches (90 ± 1) °C.

The efficiency is the ratio between the sum of the quantities of heat absorbed by vessels and the water that they contain and the quantity of heat released at the burner. A second series of tests shall be carried out from the hot condition. The hotplate is said to be hot when the water in the main vessel, used for the efficiency test, is brought to the boil, this vessel being used alone.

The requirements of 5.30.1.2 shall be met.

7 Marking

7.1 Appliance marking

The appliance shall carry the following information, in a visible and durable fashion, in the official language(s) of the country in which the appliance is to be sold:

a) name of the manufacturer or his identifying symbol;

b) appliance name;

c) type of gas (butane; butane-propane mixture; propane);

d) appliance category (for example: vapour pressure - butane)[11)];

e) brand and type of the gas container(s) intended to be used with the appliance, in the form: "This appliance shall only be used with the XYZ[12)] butane[11)] (cartridge[13)])";

f) text "Use outdoors only" for heating appliances and barbecues or "Only use in well ventilated areas" for other types of appliances. For heating appliances, the text "Use outdoors only" shall be shown on the appliance using letters at least 3 mm high;

g) text "Read the instructions before using the appliance";

h) for heating appliances and barbecues, the text "CAUTION: accessible parts may be very hot. Keep young children away from the appliance".

i) for appliances designed for use with pierceable cartridges, diagrams showing the correct sequence for the fitting of the cartridge

This information may be given on durable labels fixed onto the appliance.

7.2 Packaging marking

The packaging of the appliance shall carry the information in 7.1 c) to g) in the official language(s) of the country in which the appliance is to be sold.

8 Instructions for use, maintenance and assembly

Instructions for use, maintenance and assembly intended for the user shall be supplied with each appliance and shall give all necessary information to use the appliance safely and sensibly. Any information the manufacturer thinks useful may be given in the instructions. The use of drawings is especially recommended. The instructions shall give at least the following information, given in the official language(s) of the country in which the appliance is to be sold, in easily legible letters:

8.1 "Important: Read these instructions for use carefully so as to familiarize yourself with the appliance before connecting it to its gas container. Keep these instructions for future reference".

8.2 An introduction containing the following information:

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11) The type of gas may be shown here.

12) For example: brand A, model B.

13) Gas cartridge or refillable container.

a) name of the manufacturer (or distributor) and his identifying symbol;

b) appliance name;

c) type of gas, the appliance category and the type of gas container(s) to be used stating: "This appliance shall only be used with the XYZ[14] butane[15] (cartridge[16]);

This sentence shall be followed by "It may be hazardous to attempt to fit other types of gas containers";

d) injector marking (if it is removable);

e) nominal rate in g/h and in kW (H_s);

f) statement: "Use outdoors only" or "Use only in a well ventilated area", depending on the use (see 7.1 f).

8.3 The following safety information:

a) where applicable the statement: "Check that seals" (between the appliance and the gas container) "are in place and in good condition before connecting to the gas container";

b) drawing showing the position of these seals (if applicable);

c) statements: "Do not use the appliance if it has damaged or worn seals"; "Do not use an appliance which is leaking, damaged or which does not operate properly";

d) statement requiring that appliances, other than those solely for outdoor use, be used in a well ventilated location in accordance with national requirements:

— for the supply of combustion air;

— and to avoid the dangerous building up of un-burnt gases for appliances not fitted with a flame supervision device;

e) statement that the appliance must be operated on a horizontal surface, unless it is not intended to operate resting on a surface;

f) statement that the appliance shall be used away from flammable materials and information on minimum distances from adjacent surfaces (wall, ceiling);

g) statement that gas containers shall be changed in a well ventilated location, preferably outside, away from any sources of ignition, such as naked flames, pilots, electric fires and away from other people;

h) statement: that "If there is a leak on your appliance (smell of gas), take it outside immediately into a well ventilated flame free location where the leak may be detected and stopped. If you wish to check for leaks on your appliance, do it outside. Do not try to detect leaks using a flame, use soapy water".

8.4 The following information for use:

a) advice on how to use the appliance when it is hot (for example, the use of gloves for barbecues) and for heating appliances and barbecues, the statement: "CAUTION: accessible parts may become very hot. Keep young children away from the appliance";

---

14) For example: brand A, model B.

15) The type of gas may be shown here.

16) Cartridge or container.

b) advice on how to store the appliance when it is not in use.

8.5 The following information for assembly:

a) if the appliance is not fully assembled by the manufacturer, assembly by the user shall be precisely described (with drawings) so as to avoid any dangerous assembly by the user;

b) correct way of connecting the appliance to a gas container;

c) how to check that the appliance is connected to the gas container in a sound fashion;

d) how to detect leaks (see 8.3 h);

e) how to fix any stabilizer supplied with the appliance.

8.6 The following information for use:

a) how to light the appliance;

b) how to adjust the rate and the meaning of the symbols used for the various adjustment positions (see 5.10.2);

c) information on the phenomenon of flaring which may occur during the warm up period or if the appliance is moved. The indication on the duration of any warm up period shall be specified;

d) for appliances with flexible hose:

— maximum length to be used;

— where applicable a statement such as "After use, turn off first the gas container valve and then, after extinction of the flame, turn off the appliance tap";

— text: "Avoid twisting the flexible hose".

8.7 The following information for changing the gas container:

a) for appliances with pierceable cartridges, "check that the cartridge is empty before changing it (shake to hear the noise made by the liquid);"

b) "check that burners are extinguished before disconnecting the gas container";

c) full details on how to disconnect the gas container;

d) “check the seals before connecting a new gas container to the appliance”;

e) “change the gas container outside and away from people”;

f) information for the safe connection of the gas container.

8.8 The following information on routine maintenance of the appliance:

a) cleaning the injector (if necessary);

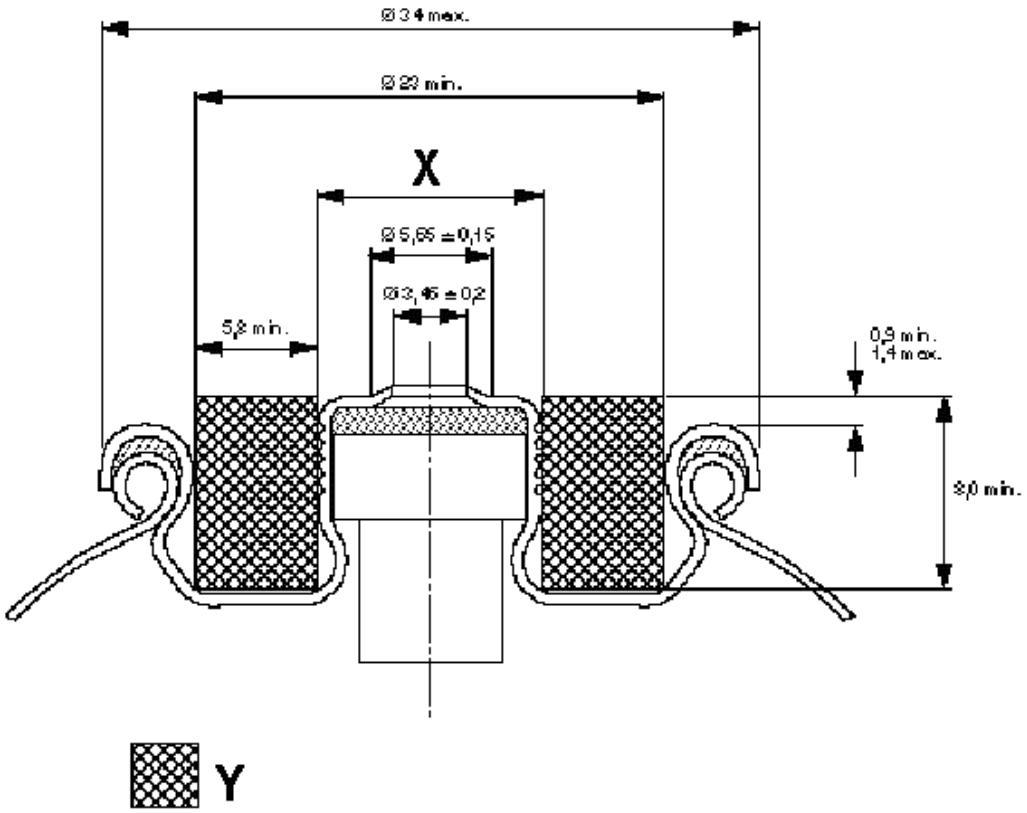
b) identification of seals replaceable by the user and how to replace them, and identification of non metallic radiant elements (see 5.3).

8.9 Information for general maintenance and repairs:

a) text: "Do not modify the appliance";

b) how to send the appliance back to the manufacturer or to a repair centre.

Dimensions in millimetres



Key

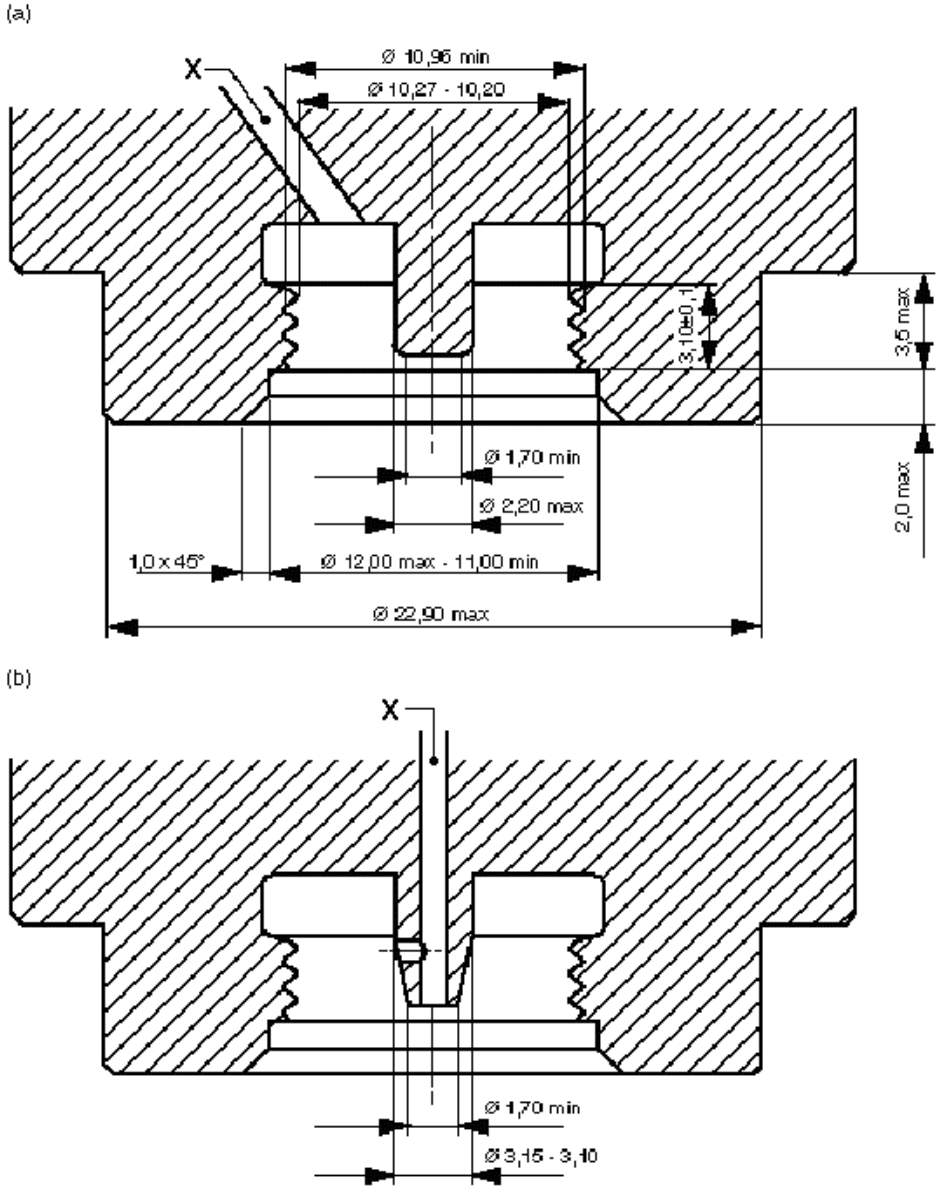
X Thread Ø7/16 in – 28 unified form special 41/2 full threads min.

Y Clearance

Figure 1 — Cross section of a valve with centre boss

(See 5.7.2.2)

Dimensions in millimetres



Key

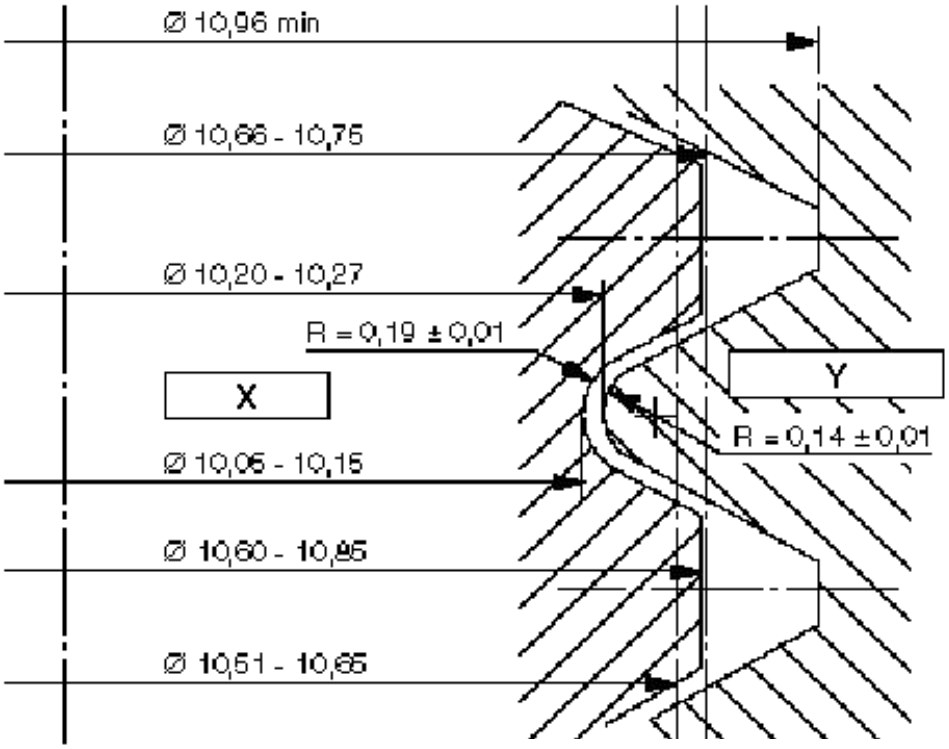
X Gas passage

Figure 2(a) – Appliance adaptor with solid gas release device

Figure 2(b) – Appliance adaptor with hollow gas release device

(See 5.7.2.2.2, 5.7.2.2.5, 5.7.2.2.6, 5.7.2.2.7, 5.7.2.2.9 and 5.7.2.2.10)

Dimensions in millimetres



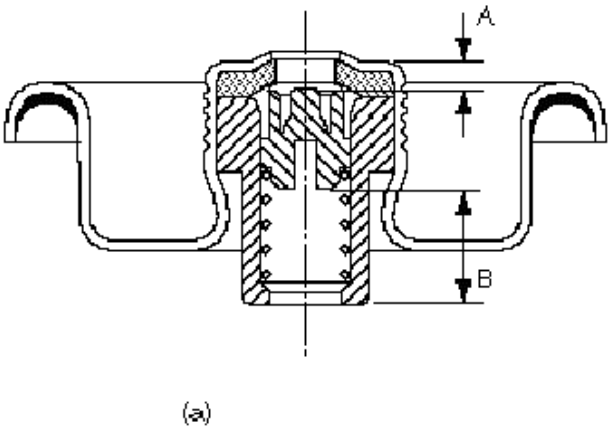
Key

X Valve

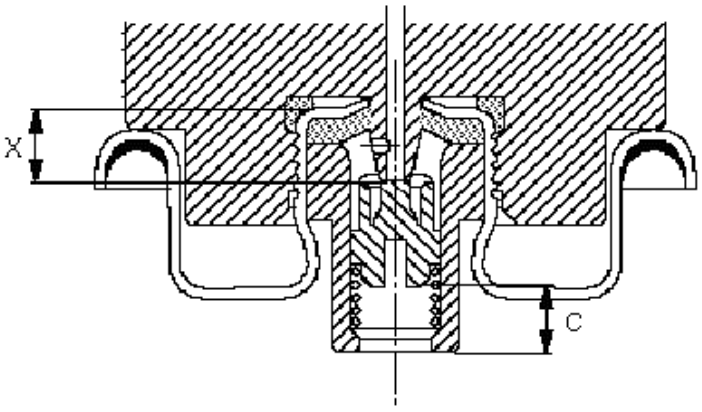
Y Adaptor

Figure 3 — Tolerances of valve and adaptor threads

(See 5.7.2.2.1)



(a)

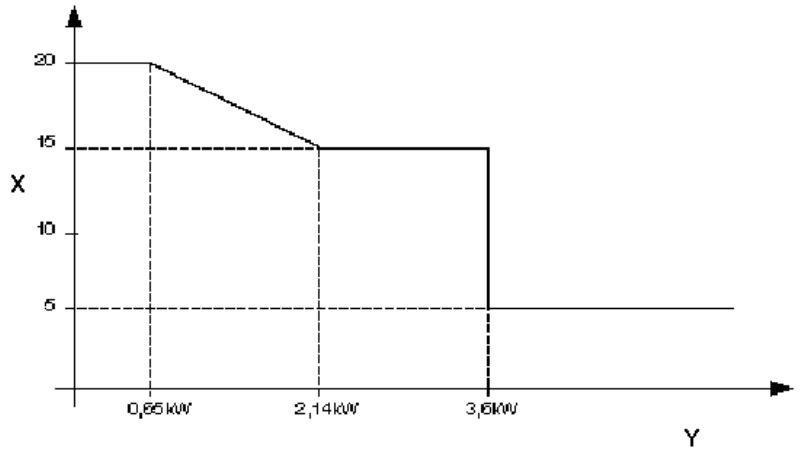


(b)

Figure 4(a) — Relative dimensions of the opening of the valve by the adaptor – valve fully closed

Figure 4(b) – Relative dimensions of the opening of the valve by the adaptor – valve fully opened

(See 5.7.2.2.8 and 6.7.2.24)



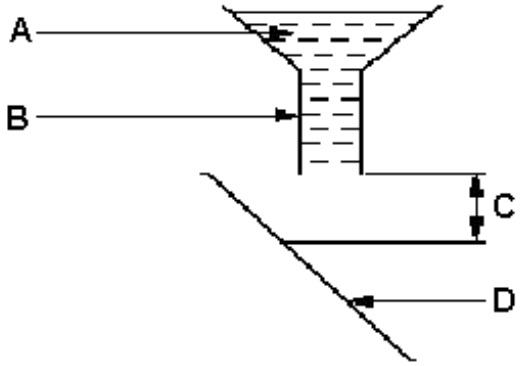
Key

X Rate tolerance %

Y Nominal rate of the burner

Figure 5 — Tolerance on rate

(See 5.19)



Key

A 50ml of water at (20 ± 3)°c

B ø int. = 2 mm

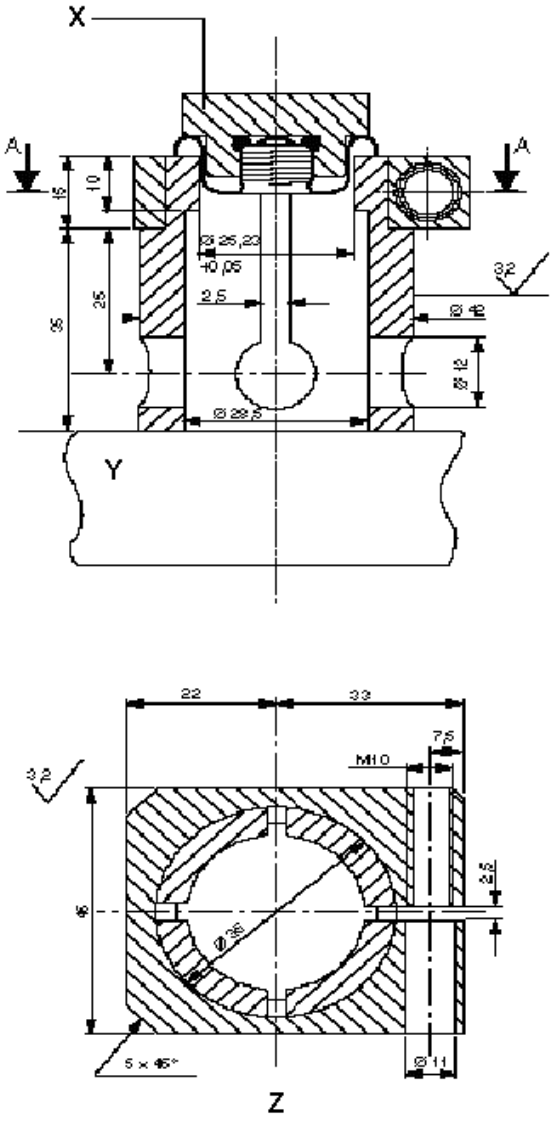
C Distance = 20 to 50 mm

D Viewing window

Figure 6 — Apparatus for the test of resistance to thermal shock

(See 6.5.1.3.1.2)

Dimensions in millimetres



Key

X Appliance adaptor

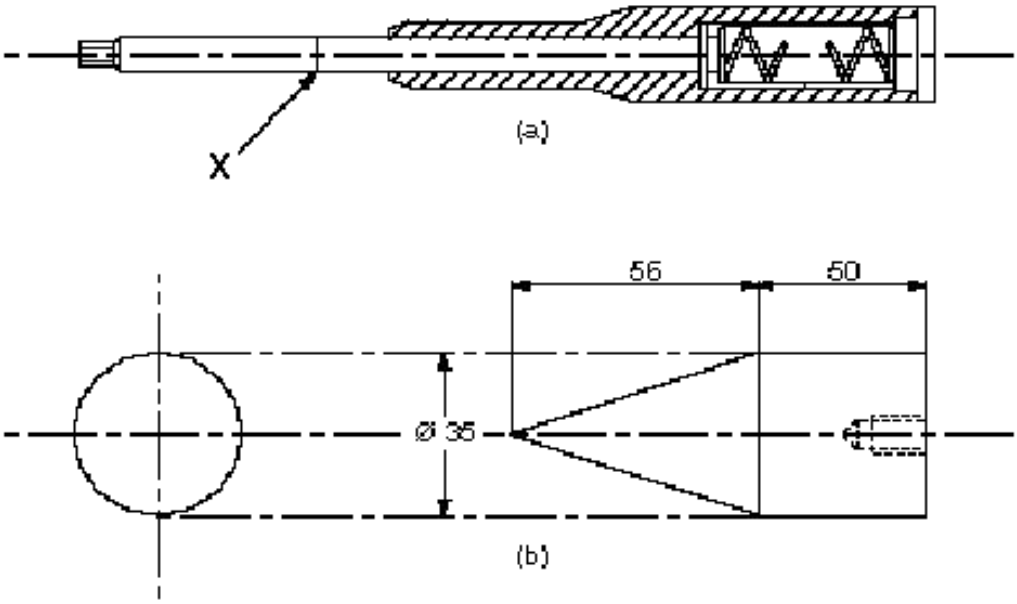
Y Base

Z View on 'AA'

Figure 7 — Test clamp

(See 6.7.2.2.3 and 6.7.2.2.4)

Dimensions in millimetres



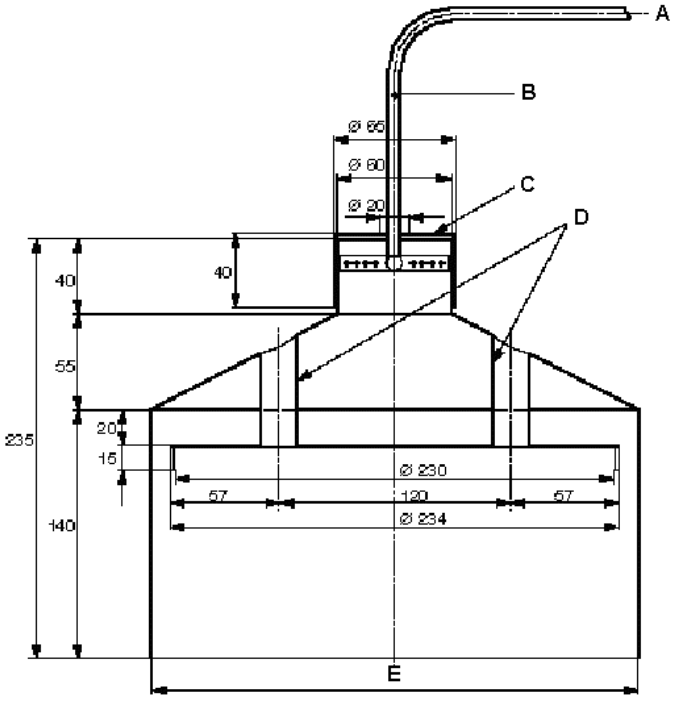
Key

X Graduation 5 Newton

Figure 8 — Test probe

(see 6.17.1)

Dimensions in millimetres



Key

A To analyser

B Copper tube 8/1

NOTE By convention 8/1 denotes diameter 8 thickness 1

C Restrictor

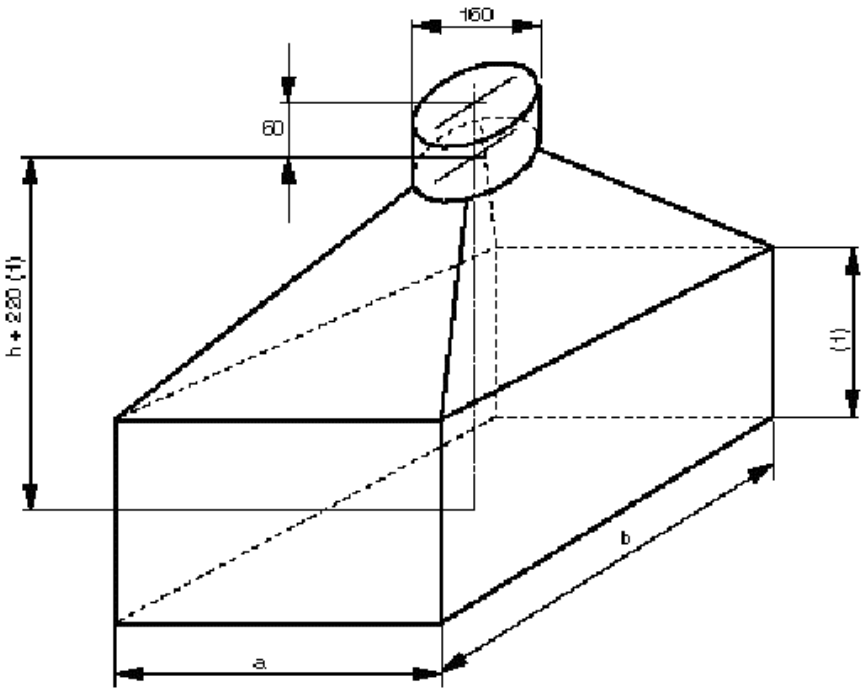
D Steel tube 22/1

E Diameter internal 258

Figure 9 — Verification of the combustion of individual hotplate burners - Sampling device

(See 6.26.2)

Dimensions in millimetres



a	500	580	680	710	630	790
b	600	700	680	780	1 140	1 000

As a guide, the six devices whose dimensions are given above cover most cases met.

(1) h > 320 allows the opening of lids or enough space between the device and covered burners.

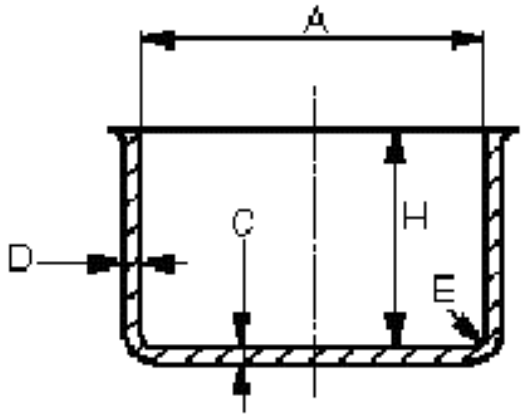
Figure 10 — Verification of the combustion of all burners - Sampling device

(See 6.26.2)

Annex A
(normative)

Characteristics of test vessels (see 6.5.2.3)

The pans required for testing hotplates shall comply with Figure A.1 and their dimensions shall comply with Table A.1.



Key

A Internal diameter measured at the top
H Internal height
C Base thickness
D Wall thickness
E Internal radius

Figure A.1 Characteristics of test vessels

Table A.1 — Characteristics of pans necessary for testing

		Dimensions												Tolerance
		12	14	16	18	20	22	24	26	28	30	32	34	
A	mm	120	140	160	180	200	220	240	260	280	300	320	340	± 1%
H	mm	90	100	110	120	130	140	150	160	170	180	190	200	± 1%
C min	mm	1,6	1,6	1,8	2	2	2	2	2,5	2,5	2,5	2,5	2,5	
D min	mm	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,8	1,8	1,8	1,8	1,8	
E	mm	2	2	2,5	2,5	2,5	3	3,5	3,5	3,5	3,5	3,5	4	+ 0,5 0
Base area	cm^2	113	154	201	254	314	380	452	531	615	707	804	907	
Mass	g	220	270	340	440	540	680	800	965	1130	1350	1520	1800	± 5%
Mass of lid [a]	g	58	70	86	105	125	149	177	208	290	323	360	402	

[a] Mass without handles, calculated for aluminium lids (density 2 700 kg/m^3) given for information.

Annex B
(normative)

Tests on needle valves (see 6.9)

B.1 Resistance to temperature

The soundness of 3 valves is checked with air at the following pressures:

— appliances burning butane : 0,5 bar and 8 bar;

— appliances burning a butane-propane mix : 0,5 bar and 12 bar;

— appliances burning propane : 0,5 bar and 18 bar.

Soundness is checked under the following conditions:

a) on delivery at ambient temperature;

b) at ambient temperature after maintaining the valve for 120 h at (40 ± 5) °C;

c) after cooling to (– 20 ± 5) °C for 24 h, in turn, at the following temperatures:

— ($0\ ^{+5}_{0}$) °C);

— ambiant temperature;

— ($70\ ^{+5}_{0}$) °C);

— ambiant temperature.

For each test, the leak shall be less than 0,05 l/h, valve closed and valve open (injector sealed).

B.2 Endurance

The soundness of 2 valves is checked using air at ambient temperature after an endurance test of 2 000 cycles at the pressures given in B.1.

Test method:

— the life test is carried out at ambient temperature with air flowing through the valve at a pressure of 0,5 bar;

— a cycle comprises the rotation from the closed position to the fully open position (without applying force to the stop) and, without stopping, reverse the rotation to the closed position with the application of a torque of 0,3 Nm;

— the frequency shall be 6 ± 2 cycles/min;

— at the end of 2 000 cycles, the valve is closed with a torque of 0,5 Nm and soundness is checked with air at the pressures given in B.1. It is checked at the same pressures, with the valve open (injector sealed).

The leak shall be less than 0,05 l/h.

Annex C
(informative)

Examples of authorized solutions

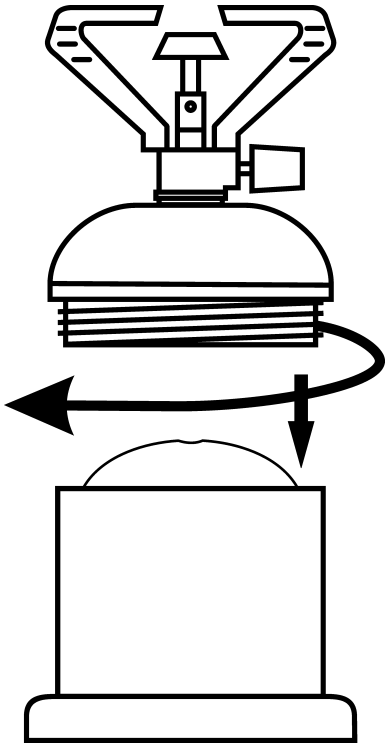
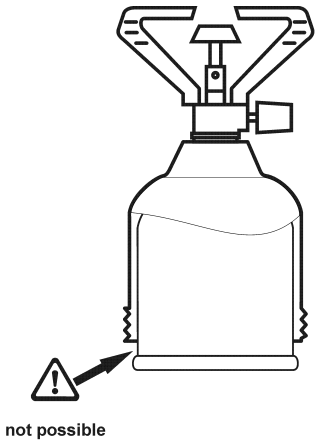


Figure C.1

— pierceable device is fixed with the top housing;

— the cartridge is held by a housing which is made in two pieces screwed together: small upper part, large bottom.



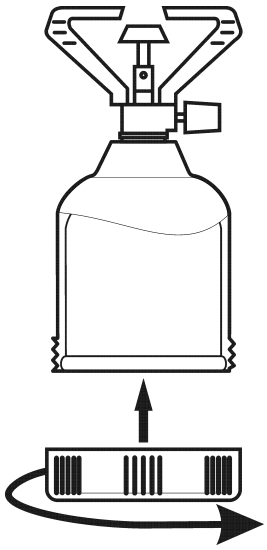


Figure C.2 **Figure C.3**

— pierceable device is fixed with the top housing;

— the cartridge should not extend beyond the lower edge of the housing (see Figure C.2);

— the cartridge is held by a large housing which has a small removable part (screw type system) at the bottom to close the housing.(see Figure C.3).

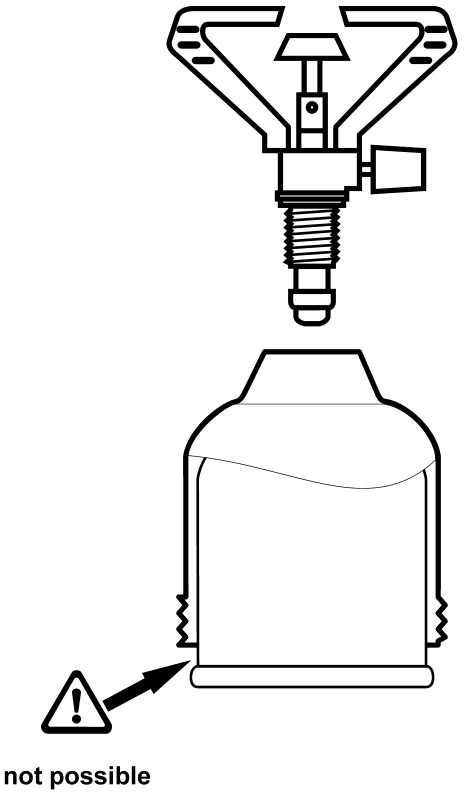


Figure C.4

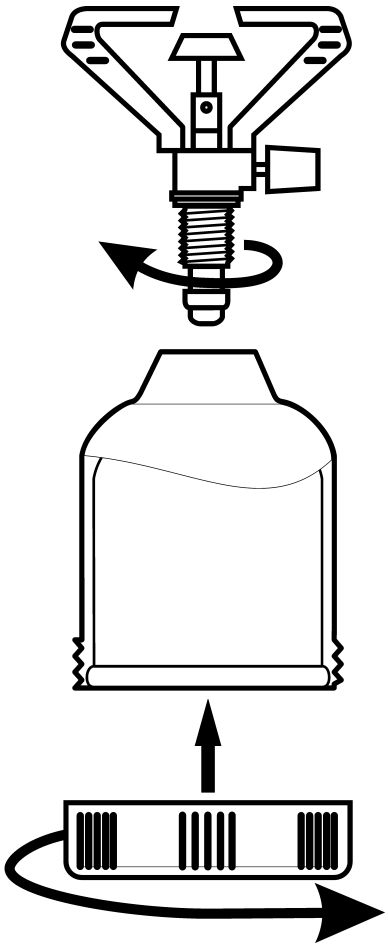


Figure C.5

— pierceable device is removable from the housing;

— the cartridge should not extend beyond the lower edge of the housing (see Figure C.4);

— the cartridge is held by a large housing which has a removable part (screw type system) at the bottom to close the housing.(see Figure C.5).

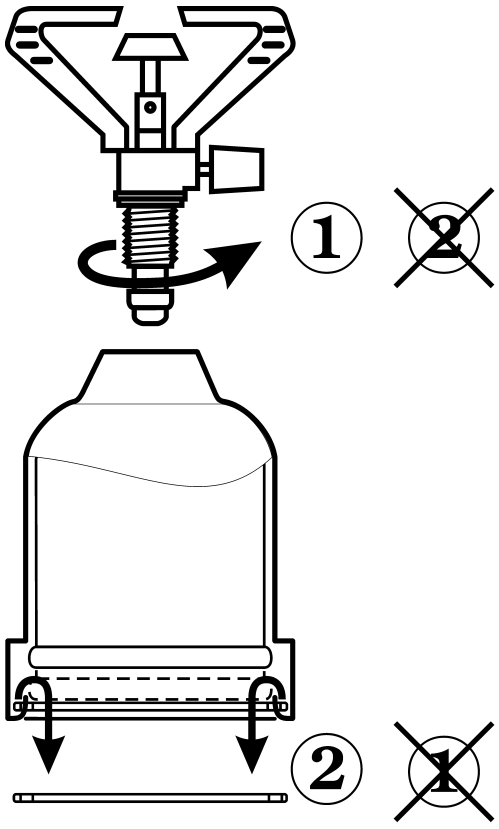


Figure C.6

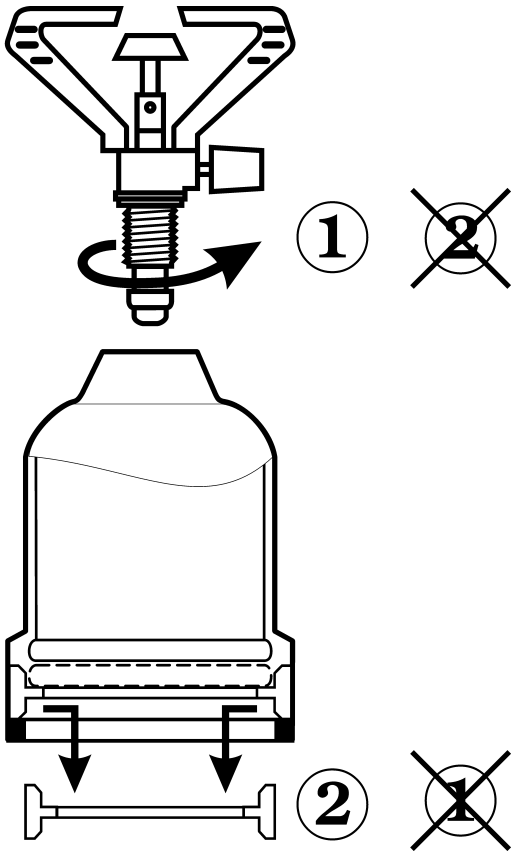


Figure C.7

— pierceable device is removable from the housing;

— the cartridge is held by a large housing which has a movable part 2 (see Figure C.6 or C.7) which cannot be removed unless the piercing device 1 (see Figure C.6 or C.7) is removed before.

Annex ZA
(informative)

Clauses of this European Standard addressing essential requirements or other provisions of EU Directive

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 the Gas Appliance Directive (90/396/EEC).

WARNING: Other requirements and other Directives may be applicable to the product falling within the scope of this standard.

The following clauses of this standard are likely to support requirements of the Gas Appliance Directive.

Compliance with this standard provides one means of conforming with the specific essential requirements of the Directive concerned.

Table ZA.1

Essential requirements	Subject	Requirements in the standard	Comments
1	Annex 1 General conditions		
1.1	Safety of operation	1	
1.2	Marking and instructions Installation instructions Users instructions Warnings Official languages	 8 7.1 - 7.2 7.1 - 7.2 - 8	 Not applicable
1.2.1	Installation instructions		Not applicable
1.2.2	Content of the users and maintenance instructions	8	
1.2.3	Appliance and packing marking	7.1 - 7.2	
1.3	Fittings		Not applicable
2	Materials		
2.1	Characteristics	5.3	
2.2	Guarantee	1 and foreword	
3	Design and construction		
3.1	General		

"to be continued"

Table ZA.1 (*continued*)

Essential requirements	Subject	Requirements in the standard	Comments
3.1.1	Resistance to strength	5.3 - 5.4 - 5.5 5.7 - 5.8 - 5.9 - 5.12 - 5.14 - 5.15 - 5.16 - 5.17 - 5.18 - 5.20 - 5.21 c). d)	
3.1.2	Condensation	5.29	
3.1.3	Risk of explosion	5.6 - 5.3	
3.1.4	Air and water penetration		Not applicable
3.1.5	Normal fluctuations of auxiliary energy		Not applicable
3.1.6	Abnormal fluctuations of auxiliary energy		Not applicable
3.1.7	Hazards of electrical origin		Not applicable
3.1.8	Pressurized parts	5.7.3 - 5.9 - 5.20 - 5.28	
3.1.9 3.1.10	Failure of safety devices Flame supervision device Safety and controlling device	5.13 5.13	
3.1.11	Protection of parts adjusted by the manufacturer	5.2 - 5.4	
3.1.12	Marking of handles and of control or adjusting devices	5.10	
3.2	Unburned gas release		
3.2.1	Risk of leaks	5.6 - 5.7 - 5.14	
3.2.2	Accumulation in the appliance	5.13 - 5.18.1 - 5.27	
3.2.3	Accumulation in rooms	7- 8.3	
3.3	Ignition	5.12 - 5.23	
3.4	Combustion		
3.4.1	Flame stability - Concentration of substances hazardous to health in the products of combustion	5.11 - 5.19 - 5.23 - 5.24 - 5.25 - 5.26 - 5.29	
3.4.2	Accidental release of combustion products		Not applicable
3.4.3	Abnormal draught conditions		Not applicable
3.4.4	Quantity of CO in the room (flueless heaters and water heaters)		Not applicable
3.5	Rational use of energy	5.30 - 1	

"to be continued"

Table ZA.1 (*concluded*)

Essential requirements	Subject	Requirements in the standard	Comments
3.6	Temperatures		
3.6.1	Floor and adjacent surfaces	5.22	
3.6.2	Control handles	5.21..1 a) & b) - 5.21.2	
3.6.3	Temperatures of external surfaces	5.21.1 e) - 7.1 h) - 8.4 a)	
3.7	Materials in contact with food and sanitary water	5.3	"Potable water" - non applicable
	Annex II	1 & foreword	
	Annex III	7.1	

WARNING — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

Bibliography

[1] EN 417, *Non-refillable metallic gas cartridges for liquefied petroleum gases, with or without a valve, for use with portable appliances — Construction, inspection, testing and marking*

[2] EN ISO 9994, *Lighters — Safety specification (ISO 9994:2002)*

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