

Specification for

Gas burning appliances —

**Part 3: Domestic cooking appliances
burning gas**

UDC 643.334:683.995:662.76

Cooperating organizations

The Gas Standards Committee, under whose direction this British Standard was prepared, consists of representatives from the following:

British Combustion Equipment Manufacturers' Association
 British Gas Corporation*
 Chartered Institution of Building Services
 Department of Energy (Gas Standards Branch)*
 Department of the Environment (Housing and Construction)
 Department of the Environment (PSA)
 Heating and Ventilating Contractors' Association
 Institution of Gas Engineers*
 Liquefied Petroleum Gas Industry Technical Association (UK)*
 National Association of Plumbing, Heating and Mechanical Services
 Contractors
 Society of British Gas Industries*
 Water-tube Boilermakers' Association

The organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee involved with the work on this standard:

Association of Control Manufacturers
 British Non-ferrous Metals Federation
 Consumer Standards Advisory Committee of BSI
 Department of the Environment
 Hevac Association
 Institution of Fire Engineers
 National Brassfoundry Association
 National Water Council
 Royal Society for the Prevention of Accidents'

This British Standard, having been prepared under the direction of the Gas Standards Committee, was published under the authority of the Executive Board and comes into effect on 30 May 1980

© BSI 06-1999

The following BSI references relate to the work on this standard:
 Committee reference GSE/17
 Draft for comment 76/72595 DC

ISBN 0 580 11099 0

Amendments issued since publication

Amd. No.	Date of issue	Comments
4162	March 1983	
4405	April 1984	
4878	June 1985	
5220	January 1987	
6642	March 1991	
6883	July 1992	Indicated by a sideline in the margin



Documents

Document Sharing Hub

Contents

	Page
Cooperating organizations	Inside front cover
Foreword	iv
Brief history	2
1 General	
1.1 Scope	3
1.2 Field of application	3
1.3 Terminology	3
1.4 Classification	5
1.4.1 Classification of gases	5
1.4.2 Classification of appliances	6
2 Constructional characteristics	
2.1 General	6
2.1.1 Conversion to different gases	6
2.1.2 Materials	7
2.1.3 Ease of cleaning and maintenance	7
2.1.4 Strength of assembly	7
2.1.5 Soundness of the gas circuit assembly	8
2.1.6 Connections	8
2.1.7 Locking of castors	8
2.1.8 Appliance fixing	8
2.1.9 Electrical requirements	8
2.2 Special conditions	8
2.2.1 Taps	8
2.2.2 Control handles	9
2.2.3 Injectors and adjusters	10
2.2.4 Oven thermostats	10
2.2.5 Ignition devices	10
2.2.6 Safety devices	10
2.2.7 Governors	11
2.2.8 Hotplates	11
2.2.9 Ovens and grills	13
2.2.10 Cylinder compartment (for appliances incorporating a liquefied petroleum gas cylinder)	14
2.2.11 Appliances with a plate-rack	14
2.2.12 Appliances with enclosed compartments	14
3 Performance characteristics	
3.1 General	15
3.1.1 Soundness: durability of method of sealing	15
3.1.2 Obtaining the input rates	15
3.1.3 Safety devices	15
3.1.4 Safety of operation	15
3.1.5 Heating	16
3.1.6 Overheating of the LPG cylinder and its compartment	17
3.1.7 Total input to the appliance	17
3.1.8 Governor performance	17
3.2 Hotplates	17
3.2.1 Safety of operation	17
3.2.2 Combustion	17

	Page
3.2.3 Efficiency	18
3.3 Ovens and grills	18
3.3.1 Safety of operation	18
3.3.2 Combustion	18
3.3.3 Oven temperature	18
3.3.4 Maintenance consumption of oven	19
3.3.5 Oven performance	19
3.3.6 Grill performance	19
3.3.7 Ovens with time control systems	19
4 Test methods	
4.1 General	19
4.1.1 Reference and test gases	19
4.1.2 Test pressures	21
4.1.3 Test procedures	21
4.2 Verification of the constructional characteristics	22
4.2.1 Strength of the appliance body	22
4.2.2 Stability of the oven and grill furniture and of the oven door	22
4.3 Verification of the performance characteristics	23
4.3.1 General tests	23
4.3.1.1 Soundness: Durability of the method of sealing	23
4.3.1.2 Obtaining the rates	23
4.3.1.3 Flame failure device delay times	24
4.3.1.4 Safety of operation	25
4.3.1.5 Heating	26
4.3.1.5.1 Test conditions	26
4.3.1.5.2 Test methods	26
4.3.1.6 Overheating of the LPG cylinder and its compartment	28
4.3.1.7 Total rate of the appliance	28
4.3.1.8 Governor performance	28
4.3.2 Specific tests for hotplates	28
4.3.2.1 Safety of operating	28
4.3.2.2 Combustion	30
4.3.2.3 Efficiency	31
4.3.3 Specific tests for ovens and grills	32
4.3.3.1 Safety of operation	32
4.3.3.2 Combustion	33
4.3.3.3 Oven temperature	33
4.3.3.4 Maintenance consumption of oven	33
4.3.3.5 Oven performance	34
4.3.3.6 Grill performance	34
4.3.3.7 Ovens with time control systems	34
4.4 <i>Text deleted</i>	34
4.5 <i>Text deleted</i>	34
4.6 Marking	34
4.6.1 Data plate	34
4.6.2 Quality seal	35
4.6.3 Instructions	35
5 <i>Text deleted</i>	35

	Page
Appendix A Dimensions of the pans for the efficiency tests	36
Appendix B Methods of test and assessment criteria for the cooking performance of ovens	46
Appendix C Guide to the implementation of BS 5386-3:1980	36
Appendix D Schedule of standards relevant to component parts of the appliance	63
Appendix E Explanatory notes on requirements for “obtaining the nominal rates”	67
Appendix F Characteristics of the pans required for the test on electric cooking plates	69
Appendix G Surface temperature probe	70
Figure 1 — Strength test	37
Figure 2 — Strength test	37
Figure 3 — Stability of the oven furniture and oven door	38
Figure 4 — Apparatus for testing soundness	39
Figure 5 — Apparatus for testing durability of methods of sealing	40
Figure 6 — Stability of pilot flames: apparatus for the draught test	41
Figure 7 — Stability of pilot flames: schematic showing the arrangement of the apparatus for the draught test	42
Figure 8 — Measurement of the rise in vapour pressure	43
Figure 9 — Pendulum for testing the draught resistance of hotplate burners	44
Figure 10 — Combustion test: Sampling hard for individual hotplate burners	45
Figure 11 — Combustion test: hood for sampling all hotplate burners together	46
Figure 17 — Typical surface temperature probe	70
Figure 18 — Test apparatus for the validation of the surface temperature probe	71
Table 1 — Diameter of pan in relation to nominal input of burner	12
Table 2 — Types of burner	12
Table 3 — Reduced rates	15
Table 4 — Maximum pressure increase inside the L.P.G. cylinder	17
Table 5 — Quantity of CO in the combustion products	18
Table 6 — Test gases corresponding to the categories of appliances	19
Table 7 — Characteristics of the test gases	20
Table 8 — Test pressures	21
Table 9 — Verification of the combustion	30
Table 10 — Percentage of CO ₂	31
Table 11 — Diameter of pan/mass of water	31
Table 20 — Dimensions of the pans for the efficiency tests	36
Table 21 — Dimensions of test saucepans	70
Publications referred to	Inside back cover

Foreword

This British Standard, which has been prepared under the direction of the Gas Standards Committee, was formerly a dual-numbered British-European standard BS 5386-3 (EN 30). For reasons of safety a number of amendments to EN 30 have been tabled by the UK within the responsible CEN Technical Committee, TC 49. While these amendments are being debated and submitted to the CEN voting procedures, the BSI Technical Committee, GSE/17, that steers this work has decided that these additional safety requirements should be included in the British Standard. This decision has necessitated divorcing BS 5386-3 from EN 30. The separation of the British and European standards has been implemented by Amendment No. 2 which also contains the additional safety requirements.

The requirements relating to oven performance and to electrical safety which perforce were given in the national foreword of the dual-numbered standard are, by this amendment, now incorporated in the body of the standard.

Appendix C, Appendix D and Appendix E give guidance to manufacturers, certification authorities and test houses on the implementation of this standard.

After the publication of Amendment No. 4, the CEN Technical Committee TC 49 began the revision of EN 30 and thus further amendment of BS 5386-3 was prevented by the CEN standstill obligation. However, because of pressure by European consumers, TC 49 has given precedence to the revision of those requirements that relate to the surface temperature of the front of the appliance. These requirements form the subject of a recently approved Harmonization Document HD 1003 which is now being implemented, in respect of freestanding cookers, by the publication of this amendment to BS 5386-3.

The requirements of HD 1003 parallel those already accepted by CENELEC for electrical cookers and will be incorporated in the revision of EN 30. This, when it receives a majority vote, will supersede BS 5386-3.

Certification. Attention is drawn to the certification facilities described on the inside back cover of the standard.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, the EN title page, pages 2 to 72, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Key words: Gas appliances, cooking devices, cookers, ovens, grills, hotplates, specifications, safety devices, tests, performance tests, marking.

English version

Domestic cooking appliances burning gas

Appareils de cuisson domestiques
utilisant les combustibles gazeux

Haushalt-Kochgeräte
für gasförmige Brennstoffe

This European Standard was accepted by CEN on 1979-01-19. The CEN members are bound to adhere to the CEN Internal Regulations which specify under which conditions this European Standard has to be given, without any alteration, the status of a national standard.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Central Secretariat or to any CEN member.

This European Standard is established by CEN in three official versions (English, French, German). A translation made by another member under its own responsibility, in its own language, and notified to CEN, has the same status.

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

CEN

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

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

Brief history

EN 30 Edition 2 incorporating Amendment 1

The European Standard EN 30 has been produced by the technical committee CEN/TC 49 “*Gas cooking appliances*”.

A first edition of this standard was published on 1976-09-25.

The second edition, including Amendment 1 of March 1977, was adopted by CEN on 1979-01-19 following its acceptance by the following member countries:

Belgium, Denmark, France, Germany, Portugal, Spain, United Kingdom.

It is subject to subsequent amendments or additions resulting from the studies of the technical committee CEN/TC 49, and ratified in accordance with the procedures for revision laid down in the framework for adaptation to technical development.

Amendment 2, 1980 (affecting all language versions) Amendment 2 to the European Standard EN 30, produced by the technical committee CEN/TC 49 “*Gas cooking appliances*” in 1978, was adopted by CEN on 1979-10-26 following its acceptance by the following member countries:

Belgium, Denmark, France, Germany, Ireland, Spain, United Kingdom.

1 General

1.1 Scope

This standard specifies the construction, performance and electrical characteristics, particularly those that relate to safety, the test methods and the marking of domestic cooking appliances burning gas, referred to in the body of the text as “appliances”.

1.2 Field of application

This standard covers the following types of domestic appliance, as defined in 1.3:

- independent hotplates;
- table cookers;
- ovens;
- grills;
- cookers.

The requirements apply to these appliances or their component parts whether or not the latter are independent or incorporated into a single appliance, even if the other components of the appliance do not burn gas (e.g. combined gas-coal or gas-electric cookers).

This standard does not apply to appliances intended to be built-in.

An appliance supplied with third family gas directly from a cylinder at a pressure greater than those defined in 4.1.2 is outside the field of application of this standard.

Item(s) of auxiliary equipment and means of sealing defined in 1.3 and fitted as part of appliances covered by this standard shall comply with the requirements of relevant British Standards.

1.3 Terminology

conversion. An operation carried out by a specialist at the time of a change of gas.

appliance incorporating a cylinder. An appliance (cooker) working on liquefied petroleum gas (LPG) which includes a compartment for the cylinder.

built-in appliance. An appliance intended for installation in a kitchen cabinet or unit, in a housing located in a wall, or under similar conditions.

Such an appliance does not necessarily have a casing on all sides.

domestic cooking appliance. An appliance that is intended to be used by private individuals. This is evident from the construction, the instructions for use and maintenance and the technical instructions for installation and adjustment.

auxiliary equipment. Auxiliary equipment comprises:

- taps and cocks;
- gas governors;
- flame failure devices;
- thermostats;
- multifunctional controls;
- automatic shut-off valves.

yellow tipping. Phenomenon characterized by the appearance of yellow colouring at the top of the blue cone of an aerated flame.

locking of an adjuster. If an adjuster, after having been adjusted by the manufacturer or installer, is immobilized in this position by an effective means (screw, plug etc.), it is said to be locked in this position.

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

aerated burner. A burner in which part of the air for combustion, termed “primary air”, is mixed with gas before the burner port: the remainder of the air drawn in at the port is termed “secondary air”.

It generally consists of:

- a body formed by a venturi and a mixing tube;
- a head or cap either integral with the burner or removable.

non-aerated burner. A burner in which the air for combustion is entrained entirely at the burner outlet.

covered burner. A burner where the pan being heated is screened from direct flame contact by the interposition of a flat surface on which it rests.

uncovered burner. A burner where the pan being heated is in direct contact with the flames.

oven and grill furniture. Accessories supplied with the appliance for cooking in the oven and grill. These are, for example:

- the grid to support food which is cooked in the oven or under the grill and to keep the food from contact with cooking juices. It also serves as a shelf for supporting dishes in the oven.
- the meat tin used to collect juices from cooking and to hold food cooked in the oven.
- the baking sheet to hold small pastries.

shut down lid. A lid intended to be shut down over the hotplate.

cooker. A cooking appliance resting directly on the floor, comprising:

a hotplate including one or more burners; one or more ovens, with or without a thermostat; possibly a grill, which can be of the contact or radiant type.

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

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

volume or mass rate

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

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

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

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

restrictor. A device with a calibrated orifice which is placed in the path of the gas flow between the inlet connection of the appliance and a burner to create a pressure loss and thus reduce the gas pressure at the burner to a predetermined value.

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

It may be:

- either electric (resistance, spark ...);
- or thermal (pilot), etc ...

safety device: flame failure device. A device including a sensing element which causes the gas supply to a burner to be opened or closed according to the presence or absence of the flame which activates the sensing element.

oven. A closed compartment for cooking roasts, pastries, etc.

shelf supports/runners. Supports in the side walls of an oven to support the oven furniture.

pan support. A support placed above a hotplate burner, which keeps the pan being heated at a set distance from the burner.

grill. An appliance for dry cooking or grilling at a high temperature, either by radiation or direct contact.

oven viewing panel. A glass area allowing the inside of the oven to be seen. The oven viewing panel also includes a zone 1 cm wide around the transparent part.

Wobbe number. This is given by the formula:

$$\frac{H}{\sqrt{d}}$$

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

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

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

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

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

It may be:

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

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

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

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

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

oven drop door. An oven door with a horizontal axis of rotation.

net calorific value (net C.V.). The quantity of heat produced by combustion, at constant pressure, of unit volume or mass of the gas under consideration, the products of combustion being brought to a temperature of 0 °C, the water produced by combustion being assumed to be retained in the vapour state and the air necessary for combustion being considered as previously dry at 0 °C. It is expressed in megajoules referred either to 1 m³ of the dry gas measured at 0 °C at a pressure of 1.013 bar or to 1 kg of dry gas.

gross calorific value (gross C.V.). The quantity of heat produced by the combustion, at constant pressure, of unit volume or mass of the considered gas, the water produced by the combustion being condensed.

It is expressed in megajoules referred either to 1 m³ of dry gas measured at 0 °C at a pressure of 1.013 bar or to 1 kg of dry gas.

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

table cooker. A cooking appliance resting on a raised support or stand. It consists of

- a hotplate comprising one or more burners;
- an oven;
- possibly a radiant or contact grill.

governor. A device which provides a sensibly constant downstream pressure when the upstream pressure is variable.

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

tap. A device to isolate the gas supply to the various burners and to adjust their rate during use.

sealing of an adjuster. If the locking of an adjuster is achieved by a means such that any attempt to change the adjustment makes the interference with the adjuster apparent (for example, breaking of a sealing material), the adjuster is said to be sealed in the adjusted position.

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

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

independent hotplate. A cooking appliance consisting of a hotplate which may comprise one or more burners.

hotplate. Part of a cooking appliance comprising one or more covered or uncovered burners and designed to support cooking vessels.

primary aeration rate. The ratio

$$\frac{\text{volume of primary air}}{\text{volume of theoretical air}}$$

primary air. The volume of air entrained at the injector by unit volume of gas.

theoretical air. The volume of air necessary for the complete combustion of a unit volume of gas.

thermostat. A device to maintain automatically a selected constant temperature. It includes a graduated scale for the selection of the temperature depending on the cooking being undertaken.

float rail. The piping which distributes gas to the various burners.

pilot. Small burner which ensures the ignition of a main burner by means of a flame.

permanent pilot. Pilot that needs manual intervention independent of the manual or automatic operation of the main burner in order to be shut off.

means of sealing. Any device either static or dynamic intended to ensure soundness; for example, flat-faced (washered) joints, O-rings, conical joints, diaphragms, greases, pastes and mastics.

1.4 Classification

1.4.1 Classification of gases. Gases likely to be used are classified in three families according to the value of their Wobbe number.

1st family (manufactured gases of groups a and b)

Wobbe number between

23.9 and 31.4 MJ/m³ gross C.V.

21.5 and 28.7 MJ/m³ net C.V.

2nd family

Wobbe number between

41.3 and 58.0 MJ/m³ gross C.V.

37.1 and 52.4 MJ/m³ net C.V.

The second family contains the following two groups:

Group H

Wobbe number between

48.1 and 58.0 MJ/m³ gross C.V.

43.4 and 52.4 MJ/m³ net C.V.

Group L

Wobbe number between

41.3 and 47.3 MJ/m³ gross C.V.

37.1 and 42.7 MJ/m³ net C.V.

3rd family (L.P.G.)

Wobbe number between

77.4 and 92.4 MJ/m³ gross C.V.

72.0 and 85.3 MJ/m³ net C.V.

1.4.2 Classification of appliances. Appliances are classified into categories according to the gases that they are designed to use. However, in the UK, because of the types of gas available and the supply pressures of the categories defined hereafter, only I_{2H}, I₃ and II_{2H3} are applicable. For each category, requirements shall not differ from those specified in this standard.

1.4.2.1 Categories I. Appliances designed exclusively for use with gases of a single family or possibly with gases of a single group at fixed supply pressures:

a) *Appliances designed for use with 2nd family gases category I₂:* An appliance capable of using all 2nd family gases; replacement of a gas in group H by a gas in group L or vice versa shall not necessitate any change to the appliance (not even an adjustment to the burners) but is accompanied by a modification of the supply pressure at the inlet to the appliance in such a way as to keep the heat input constant to within $\pm 5\%$.

category I_{2HL}: An appliance capable of using all 2nd family gases; the replacement of a gas in group H by a gas in group L or vice versa necessitates an adjustment to the burners and possibly a change of injectors; the supply pressure at the inlet to the appliance may be kept constant or may possibly be changed.

category I_{2H}: An appliance for use with gases in group H of the 2nd family only.

category I_{2L}: An appliance for use with gases in group L of the 2nd family only.

b) *Appliances designed for use with 3rd family gases category I₃:* An appliance capable of using all 3rd family gases (propane and butane).

1.4.2.2 Categories II. Appliances designed for use with gases of two families at fixed supply pressures:

a) *Appliances designed for use with 1st and 2nd family gases category II₁₂:* An appliance capable of using all 1st and 2nd family gases, the use of 2nd family gases being under the same conditions as for category I₂

category II_{12HL}: An appliance capable of using all 1st and 2nd family gases, the use of 2nd family gases being under the same conditions as for category I_{2HL}

category II_{12H}: An appliance capable of using gases of the 1st family and gases in group H of the 2nd family

b) *Appliances designed for use with gases of the 2nd and 3rd families*

category II₂₃: An appliance capable of using all gases of the 2nd and 3rd families, the use of gases in the 2nd family being under the same conditions as for category I₂

category II_{2HL3}: An appliance capable of using all gases of the 2nd and 3rd families, the use of gases in the 2nd family being under the same conditions as for category I_{2HL}

category II_{2H3}: An appliance capable of using gases in group H of the 2nd family, and 3rd family gases.

category II_{2L3}: An appliance capable of using gases in group L of the 2nd family, and 3rd family gases.

1.4.2.3 Category III. Appliances capable of using gases of all three families at fixed supply pressures

2 Constructional characteristics

2.1 General

2.1.1 Conversion to different gases. The only acceptable operations when converting from a gas of one group or family to a gas of another group or family and/or to adapt for different gas distribution pressures are given below for each category.

It is recommended that these operations should be possible without disconnecting the appliance.

2.1.1.1 Categories I

category I₂: No modification to the appliance

category I_{2HL}: Adjustment of the gas rate (by adjusters on the taps or on the governor) with, if necessary, a change of injectors or restrictors.

Adjustment of primary air.

Adjustment of the gas rate of the ignition pilots of safety devices either by regulating an adjuster or by replacement of injectors or calibrated orifices.

categories I_{2H} and I_{2L}: No modification to the appliance.

category I₃: Replacement of injectors or restrictors but only in order to convert from one pressure couple

to another (for example 28 mbar/37 mbar $\Rightarrow$ 50 mbar/67 mbar).

Adjustment of primary air when converting from one pressure couple to another or from one pressure to another within a pressure couple.

2.1.1.2 Categories II

categories II₁₂, II_{12HL} and II_{12H}: Adjustment of the gas rate, with possible replacement of injectors or restrictors.

Adjustment of primary air.

Adjustment of the gas rate of the ignition pilots of safety devices either by regulating an adjuster or by the replacement of injectors or calibrated orifices and, if necessary, of complete pilots or certain of their components. Immobilizing the governor is mandatory for an appliance in category II₁₂ using 2nd family gases.

These adjustments or replacement of parts are only acceptable when converting from a gas of the 1st family to a gas of the 2nd family or vice versa. However, for category II_{12HL}, they are also acceptable in converting within the same family from a gas of one group to a gas of the other.

categories II₂₃, II_{2HL3}, II_{2H3} and II_{2L3}:

Replacement of injectors or restrictors.

Adjustment of primary air.

Replacement of pilot injectors and calibrated orifices.

These adjustments or replacements of parts are only acceptable:

- in converting from a gas of one family to a gas of another family;

- in converting from a butane/propane pressure couple to another couple (e.g. 28 mbar/37 mbar $\rightleftharpoons$ 50 mbar/67 mbar);

- in converting from one gas to another within a pressure couple of 3rd family gases, an adjustment of the primary air only is allowed. It is mandatory to immobilize the governor for use with 3rd family gases;

- in converting from a gas of group H to a gas of group L, or vice versa, but only for an appliance of category II_{2HL3}.

Moreover, for category II_{2HL3}, the operations for the adjustment of the gas rate of burners and pilots by means of appropriate adjusters are acceptable for gases of the 2nd family.

2.1.1.3 Category III. Adjustment of gas rate with, if necessary, replacement of injectors or restrictors.

Adjustment of primary air.

Adjustment of the gas rate of ignition pilots of safety devices either by regulating an adjuster or by replacement of injectors or calibrated orifices and, if necessary, of complete pilots and some of their components.

Immobilizing the governor is mandatory for use with 3rd family gases, but optional for 2nd family gases.

These operations are acceptable in converting from a gas in one family to a gas in another family and, for the 1st and 2nd family, from a gas of one group to a gas of another group.

Moreover, within the 3rd family gases the replacement of components is equally acceptable in converting from one pressure couple to another (e.g. 28 mbar/37 mbar $\rightleftharpoons$ 50 mbar/67 mbar). For gases of the 3rd family, in converting from one pressure to another within a pressure couple, only an adjustment of primary air is acceptable.

2.1.2 Materials. The quality and thickness of materials used in the construction of an appliance shall be such that the constructional and performance characteristics are not altered in use. In particular, all parts of the appliance shall withstand the mechanical, chemical and thermal conditions to which they may be submitted during their use. In normal conditions of use, of cleaning or of adjustment, the materials shall not be liable to any alterations which might impair their performance. Sheet metal parts not made of corrosion-resistant material shall be vitreous enamelled or be covered with another effective protection against corrosion; this does not apply to baking sheets.

Asbestos-containing materials shall not be used for luting, door seals or insulation.

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

Parts that are not intended to be removed by the user, e.g. injector jets, shall require the use of tools for their removal.

Sharp borders and edges which could give rise to injury to the user, for example during cleaning, shall be avoided.

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

2.1.4 Strength of assembly. 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 its good performance will not occur.

The materials used, the construction and the assembly of the body of appliance shall be such that:

for cookers. The application of a horizontal force of 500 N to the upper part of the front of the appliance body under the conditions described in 4.2.1.1 shall not give rise to a temporary distortion of the appliance body greater than 2.5 mm, this distortion being measured in the direction and plane of the force.

for all hotplates. Under the conditions described in 4.2.1.2, the application on the top of the appliance of a load whose mass expressed in kilogrammes is equal to the number of principal hotplate burners multiplied by 25, shall not cause any fracture or any permanent distortion greater than 1 mm at any point of the frame of the appliance.

2.1.5 Soundness of the gas circuit assembly.

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

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

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

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

Removable components or the threaded parts of the pipe work which may be dismantled during normal maintenance shall remain sound after several disconnections, if necessary after changing a gasket, where such exists.

2.1.6 Connections

2.1.6.1 For an appliance in category I₃ the gas inlet to the appliance may be one of two types:

- a) without a thread: for a length of at least 30 mm its extremity shall be cylindrical, smooth and clean to allow connection by means of a gas-tight compression fitting.
- b) with a thread: its extremity shall have a thread following BS 21:1973, nominal size $\frac{1}{2}$ or $\frac{1}{4}$ (major diameter 21 mm or 13 mm).

2.1.6.2 For an appliance other than one of category I₃, the end of the gas inlet connection shall have a thread conforming to BS 21:1973.

Depending on the input of the appliance and taking into account the requirements of 3.1.7, the major diameter shall be 21 mm (nominal size $\frac{1}{2}$), or 13 mm (nominal size $\frac{1}{4}$).

For all types of thread, the useful thread length shall conform to the values given in BS 21:1973.

2.1.6.3 In all cases, the end of the gas inlet connection shall be positioned to allow the free movement of a connected flexible pipe.

The connection of the gas inlet to the gas supply shall be possible from both the left and the right of the appliance.

The appliance may carry one or two points for connection. If there is only one gas inlet connection point, it shall be such that connection to the gas supply can be made from either side during the normal installation of the appliance.

If, for this purpose, a part of the pipework is movable, provision shall be made to support this pipework at the connection level.

2.1.7 **Locking of castors.** If the appliance has castors, they shall be so designed that the appliance cannot be moved accidentally.

2.1.8 **Appliance fixing.** The appliance shall be so designed that it can be provided with a fixing device, when the installation rules in force in the country where it is to be installed require appliances to be fixed.

2.1.9 **Electrical requirements.** For appliances that incorporate electrical equipment intended for connection to the domestic electrical supply of standard frequency 50 Hz single phase and of voltage not exceeding 250 V, the following requirements shall apply. They do not apply to spark ignition or other circuits operating at high voltage.

- a) The appliance and its electrical circuits and components shall comply with the appropriate requirements of BS 3456.
- b) The electrical circuits and components of the appliance shall function safely when the appliance is connected to a supply of $0.90 \times$ the minimum rated voltage and $1.10 \times$ the maximum rated voltage.

2.2 Special conditions

2.2.1 Taps

2.2.1.1 *General.* Each burner shall be controlled by a tap or a device assuring the opening and closing of its supply.

Taps shall be placed in such a way that their strength, operation, manipulation and accessibility undergo no damage from actions to which they are subjected in normal use, and they shall be protected against external clogging. Moreover, their manipulation shall remain easy after the test described in 4.3.1.5.

All parts of a tap shall be clean (e.g. free from swarf).

Taps shall be mounted in such a way that no accidental movement relative to the gas supply connection is possible. Taps shall be individually replaceable in accordance with the requirements of 2.1.5.

It shall be possible to dismantle the parts of a tap as far as necessary for its maintenance.

2.2.1.2 Plug type taps. A plug type tap shall have:

a compensating device to take up automatically any wear between the plug and the tap body.

two stops, one in the “off” position, and one at the end of the tap travel.

Moreover, when the burners do not have a flame failure device, the taps shall be so designed or their handles so positioned that they cannot be turned on accidentally.

The reduced rate may be obtained:

either at the end of the tap travel

or in an intermediate position between the closed and fully opened positions. In this case, a reduced rate position shall be provided by means of a device that arrests the tap in this position when the movement is in the direction of closing.

2.2.1.3 Needle type taps. Needle type taps shall be used only for independent hotplates of category I₃.

For this type of tap:

when opening, it shall not be possible to unscrew the needle completely from its housing. When closed, the contact of the needle on its seating shall constitute the stop.

the closing direction of needle type taps shall be indicated by an arrow whose point is directed towards the circle symbolizing the closed position, and the marking of the reduced rate position is not required.

the operating screw shall be a simple thread and have a pitch such that closure from the open position is made by at least a half-turn and at most one turn.

2.2.1.4 If an oven has a thermostat, a reduced rate position is permitted only when the tap and the thermostat are combined.

If the oven and grill burners have a combined control tap, the “off” position shall be designed to make it impossible for the tap handle to be inadvertently moved from one adjustment range to another. If the burners are fitted with flame failure devices, a combined tap requires only a device to retain it against accidental movement in the “off” position, e.g. a notch.

2.2.2 Control handles. The closed, open and reduced rate positions shall be marked in a visible and durable fashion.

If control handles operate by turning, the closing direction shall be clockwise. This does not apply to combined oven and grill taps.

In the case of handles located on the front of the appliance, all marks designating the closed position shall be in a vertical plane perpendicular to the front of the appliance and containing the axis of the handle. The marks shall be visible to a user standing in front of the appliance.

If the control handles operate by turning, and their axes are in a horizontal plane, the closure mark placed in a vertical plane shall be situated above the turning axis of the handle in its closed position. The closed position of the tap shall not give rise to any possibility of confusion with an open position.

The following symbols shall be used:

off	: a full disc	
full on (nominal rate)	: a large flame	
reduced rate	: a small flame	
	for the fixed reduced rate position	

Any special position of the tap intended for ignition and/or any special button that has to be operated to cause ignition shall be marked by a star.

It shall be obvious which burner is controlled by each tap.

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

Tap handles shall be so designed that they can neither be fitted in the wrong position nor move by themselves. The shape of a handle shall be such that its grip makes manipulation easy.

The tap handles of hotplate burners shall be clearly differentiated from those of the oven and grill burners by shape or colour, or by marks on the handle or on the fascia.

It shall be easy to distinguish between the tap handles of the burners and those of the ignition pilots.

If there is a risk of confusion between the control tap for the oven burner and the tap for the grill burner, the control tap for the oven burner shall be marked by a rectangle carrying a line at its lower part and that of the grill burner by a rectangle carrying a line at its upper part. Interchangeability of these handles shall be impossible if such interchangeability could lead to confusion.

Where the oven and grill burners are situated in the same compartment and where these burners are controlled by different handles, the handles shall be interlocked so that gas can issue from only one of the two burners at any one time.

2.2.3 Injectors and adjusters. Injectors shall be removable.

Injectors shall carry an indelible means of identification preventing any confusion, preferably the diameter of the orifice expressed in hundredths of a millimetre. This means of identification shall be carried by all injectors that have to be replaced when changing gases; in other cases it need only be carried by the taps.

An adjustable injector shall have a device enabling the component parts to be retained in the chosen adjustment position, for example an O-ring. For use on butane and propane, the gas rates shall be controlled by a calibrated injector without using any adjuster provided for the other gases, if such exists; however, pilot adjustment is admissible.

Appliances of category II_{12HL} shall have gas rate adjusters.

The presence of these adjusters is optional for appliances of categories I_{2HL}, II₁₂, II_{12H}, II_{2HL3} and III.

Appliances of categories I₂, I_{2H}, I_{2L}, I₃, II₂₃, II_{2H3} and II_{2L3} shall not be provided with such adjusting devices. Nevertheless, it is permissible to adjust the reduced rates for appliances of categories II₂₃ and II_{2H3} when using 2nd family gases; similarly for appliances of category I₂ when they coexist with category II₂₃.

Moreover, for appliances of category III and for those of category II_{2HL3} fitted with adjusters, it shall be possible to annul the function of adjusters when the appliances are supplied with a 3rd family gas. For appliances of categories II₁₂, II_{12H} and III, when they are supplied with a gas of the 2nd family:

it is mandatory to put out of operation the nominal gas rate adjusters except for appliances of category III when the gases of groups H and L are distributed at the same pressure;

it is optional whether or not the reduced gas rate adjusters are put out of operation.

The presence of primary air adjusters is optional for all categories except categories I₂, I_{2H} and I_{2L}, for which they are prohibited.

An adjuster in a sealed position is considered as non-existent.

With the exception of independent hotplates, table cookers and cookers mounted on castors, the gas rate and air rate adjusters for the various burners shall be easily accessible without having to move the appliance.

The adjusters shall be moveable only with a tool and they shall be capable of being locked in the operating position.

Adjusting screws shall be placed so that they cannot fall into the gas ways. They shall be fitted with a cap or some other sealing device.

2.2.4 Oven thermostats. The range of temperatures given by the thermostat shall be marked by a clearly visible scale moving in front of a marked index (or vice versa), this scale being either in figures, in which case the lowest temperature shall be indicated by the lowest figure, or in degrees Celsius.

The scale shall carry at least 8 marked positions.

2.2.5 Ignition devices. Where an ignition device exists, it shall guarantee rapid and safe ignition.

All the components of the ignition device shall be designed to avoid damage or accidental displacement in use. The relative positions of the ignition device and the burner shall be sufficiently well defined to ensure satisfactory operation of the assembly.

When the ignition devices include a permanent pilot, the gas rate of this pilot shall not exceed 0.06 kW on gross C.V. or 0.054 kW on net C.V., for each burner controlled.

On conversion, it shall be possible to adjust the pilot gas rate, either by an adjuster or by a change of injector.

It shall be possible to light the pilot with a match. A means shall be provided to cut off the gas supply to the ignition pilot.

2.2.6 Safety devices. Burners in an enclosed compartment shall be provided with a flame failure device controlling the main burner. If ignition can take place in a compartment with the door closed, the gas rate that is not controlled by the flame failure device during the ignition period shall not exceed 600 W. Where a flame failure device is fitted, it shall be so designed that, in the case of a failure of any of the components indispensable to its performance, the supply of the gas to the burner is cut off automatically. It shall be so mounted as to guarantee satisfactory performance.

The sensing element of a flame failure device shall control a single burner only.

The appliance shall not incorporate any device that allows the flame failure device to be permanently over-ridden.

2.2.7 Governors. Only appliances capable of using a gas of the 1st or 2nd family may be fitted with a governor, but it shall be possible to annul its function if supplied with 2nd and 3rd family gases.

Where a governor is used, it shall be mounted in such a way that its performance is not affected by heat.

A pressure test point shall be provided downstream of the governor.

The design and accessibility of the governor shall be such that it can be easily adjusted and immobilized for use with another gas, but provision shall be made to hinder any unauthorized access to the adjuster. Where a governor is locked in the open position and sealed, it is considered as non-existent. The seal shall be so applied that any interference with it shall be apparent.

2.2.8 Hotplates

2.2.8.1 General characteristics

2.2.8.1.1 Classification of hotplates. There shall be an adequate number of points of support for vessels (saucepans or stew-pots) to rest level in a stable fashion on the supports of each of the burners. In assessing compliance with this requirement, two types of pan support are recognized, the requirements for each type being given below:

Type A: The above requirement shall be satisfied for pans of which the diameter¹⁾ in relation to the nominal input of the burner is as given in Table 1.

Whatever the nominal input of the burners, it shall be possible to place a 12 cm diameter pan on the pan supports of one of them.

Moreover a 20 cm diameter pan containing 2.8 kg of water shall rest stably on the pan supports of each burner when its centre is offset 1 cm relative to the centre of the burner.

Type B: The above requirement shall be satisfied for pans from 10 cm to 20 cm in diameter both when placed centrally over each burner and when displaced up to 15 mm off-centre.

For these tests each pan is filled with water to a depth of 40 mm.

2.2.8.1.2 General requirements for both types of hotplate. Where hotplates are made up of several parts, each of these shall be so designed that it is easy to replace them correctly. Any incorrect replacement shall be obvious.

When the appliance includes one or several auxiliary burners, it is recommended that at least one of these should be able to take a pan of 6 cm diameter, if necessary with the addition of a separate support. Where special removable supports are used for small pans, the instructions for use shall specify that these supports shall not be used on burners for which they are not intended.

The pan supports of the hotplate shall guarantee a constant distance between the base of the pan and the flames, under normal use.

In the case of covered burners, removable plates shall be removable without using a tool.

It shall be possible for parts of the flames to be viewed in use.

The hotplate shall be so designed that:

the burners are so arranged that the relative distance between the axes of the burners (pilots excluded) is not less than 18 cm;

the distance of the centre of a burner from the edges of the appliance or from any obstacle is not less than 10 cm.

An appliance shall be provided with effective means to prevent spillage from pans affecting the operation of the burners, and from spillage under the hotplate. If this takes the form of spillage container(s), the capacity of each container shall be at least 0.3 dm³. If the hotplate top is hinged and can be raised without having to unlock it and move the burners, it shall be possible to raise it with the pan supports remaining in place.

Pan supports and spillage containers that are designed to be left in the raised position, e.g. for cleaning purposes, shall either be provided with a mechanical device to prevent them falling or shall not fall when displaced 5° from the fully raised position.

A shut-down lid that is designed to be left in a raised position shall either be provided with a mechanical device to prevent it falling or shall have means of damping the rate of fall such that the lid cannot cause direct personal injury.

¹⁾ See Table 20.

If a shut-down lid is associated with a hotplate gas shut-off device to prevent gas issuing from any hotplate burner when the lid is in the closed position, no hotplate burner shall be extinguished when the lid is moved 5° from the fully open position, unless the lid is retained in the fully open position by a mechanical locking device. When the lid is moved through 45° from the fully open position the gas shall be shut off. Compliance with these requirements shall be checked with the reference gas at normal test pressure with all hotplate burners operating at normal rate.

An appliance fitted with a glass shut-down lid shall comply with the following additional requirements.

- a) A hotplate gas shut-off device shall be fitted.
 - b) The glass shall comply with the fragmentation and thermal shock requirements specified in **6.1** and **6.2**, respectively, of BS 3193:1981.
 - c) When the lid is in the raised position, means shall be provided to prevent cooking vessels, when resting on the pan supports, from coming into contact with the glass. The test vessel shall be the 20 cm diameter vessel specified in Table 20.
 - d) If the hotplate incorporates a griddle plate or covered burner, the glass shall not shatter when the lid is closed after operating the burner full-on for 20 min at normal pressure using reference gas. If the hotplate incorporates more than one such burner, the test is carried out with the highest rated burner.
- The requirement does not apply to a temporary griddle if, when the griddle plate is in position, the lid cannot be fully closed.

An appliance with a metal shut-down lid but not with a gas shut-off device shall meet the following additional requirements. These requirements do not, however, apply to a small portable independent hotplate that is intended to be disconnected from the gas supply before being folded up.

- e) The underside of the lid shall carry a durable warning for the user not to close the lid unless all the hotplate burners have been turned off.
- f) When tested as in **4.3.2.1.5**, test no. 1, the burner shall not be extinguished nor shall the quantity of CO in the air- and water-free products of combustion be greater than 0.2 %.
- g) When tested as in **4.3.2.1.5**, test no. 2, the burner shall not be extinguished.

- h) When it is tested as in **4.3.2.1.5**, test no. 3, there shall be no damage or distortion of the appliance and no flames shall be emitted from the front of the appliance. This requirement does not apply if the ignition system cannot be operated with the lid in the closed position or if the ignition system is designed such that ignition takes place automatically when the tap is turned on.

Table 1 — Diameter of pan in relation to nominal input of burner

Diameter of pan	Nominal input of burner	
	with gross C.V.	with net C.V.
cm	kW	kW
12	≤ 2.3	≤ 2.09
14	> 2.3 ≤ 3.1	> 2.09 ≤ 2.83
16	> 3.1 ≤ 4.1	> 2.83 ≤ 3.66
18	> 4.1 ≤ 5.2	> 3.66 ≤ 4.71

2.2.8.2 Hotplate burners. Hotplate burners (covered or uncovered) are classified according to their nominal input, as given in Table 2.

Table 2 — Types of burner

Type of burner	Nominal rate for all gases	
	on gross C.V.	on net C.V.
	kW	kW
Auxiliary burners	≥ 0.23 < 1.16	≥ 0.21 < 1.05
Principal burners		
semi-rapid	≥ 1.16 < 2.3	≥ 1.05 < 2.09
rapid	≥ 2.3 < 3.5	≥ 2.09 < 3.14
ultra-rapid	≥ 3.5	≥ 3.14

All appliances, with the exception of independent hotplates fitted with a single rapid or ultra-rapid burner, shall have a burner giving a reduced rate not more than:

Gross C.V. : 0.29 kW

Net C.V. : 0.26 kW

Burner bodies shall be mounted in such a way that they cannot be moved accidentally from their correct positions. Where these are made up of several parts, there shall be no gas leak in an inflammable quantity at the joints of the assembly.

Parts of a burner likely to be soiled shall be removable and easy to clean. However, if these parts have an external shape that makes cleaning easy without affecting the subsequent performance of the burner, they may be fixed.

The flash tubes and parts with which they are intended to function, particularly those parts of the burner concerned with the ignition, shall be placed in well defined and fixed positions.

Burner ports shall be designed so that spillage of food does not cause internal fouling.

It shall not be possible to reassemble removable burner parts, particularly the caps, incorrectly, and they shall not be interchangeable unless of identical design.

2.2.9 Ovens and grills

2.2.9.1 Compartments. The useful volume is defined as the product of the height of the door opening and the useful plan area.

The height is calculated from the bottom to the top of the door opening, or to the lowest obstacle. Where the door is not rectangular, the mean height is taken.

The useful plan area is defined by the useful dimensions measured so as to represent the area actually available for cooking. It is therefore necessary to deduct, from the overall dimensions of the cooking chambers, the area occupied by ribs, baffles, shelf supports and ducts for combustion products that project. If the useful width thus defined is greater than the door opening, it is taken as equal to the width of the opening.

When drop doors are completely open, they shall be approximately horizontal and shall remain in this position. In addition, when a load of 15 kg is placed on drop doors or doors with a vertical axis under the conditions specified in 4.2.2.2, the front (upper) edge shall not sag by more than 15 mm and the appliance shall not tilt.

Oven furniture (accessories such as baking sheets, etc.) shall be supplied with the appliances where this is needed to allow the appliance to be used in accordance with the instructions for use.

When the manufacturer supplies a baking sheet, the area of the horizontal part of the sheet shall be at least 70 % of the useful plan area. If there is a sloping part, this shall be flat and its angle to the horizontal shall be less than 15°. In this case, the sum of the areas of the horizontal and sloping surfaces of the sheet shall be greater than 80 % of the useful horizontal plan area of the oven.

The baking sheet shall have at least one lip. It shall be possible to place it in the oven so that the lip is at the back of the oven.

The supports or runners of the compartments shall be such that, even when pulled out half-way, the oven furniture has adequate guidance and does not incline more than 10° from the horizontal (see paragraph 1 of 4.2.2.1). Even when hot, the furniture shall not jam in the slides or runners.

The oven furniture, with the exception of the baking sheet, placed in the lowest position on the supports or runners or on the floor of the oven, when this is provided for in the instructions for use, shall allow an object, whose height is 5 cm less than the useful oven height, to be placed in the oven.

For any grill pan that incorporates a handle, that handle shall be so designed that in normal use, e.g. when held to carry the grill pan or to pour out fluid contents, it does not collapse or become loose (see paragraph 2 of 4.2.2.1).

When a grill is located outside the oven compartment, the grill grid shall be so constructed that it can be placed at a distance of at least 8 cm from the radiant surface of the grill.

The distance between the bars of the oven shelves and of the grill grid shall be not greater than 35 mm.

In appliances capable of using liquefied petroleum gas, the space under the oven burners shall be so designed that any unburnt gas can escape through the oven base.

2.2.9.2 Oven and grill burners. If there is no ignition device, it shall be possible to light the oven and grill burners by hand, each at a single point in an easy and safe manner, with the compartment door open. If the oven has two burners with two taps, there may be two lighting points.

Flash tubes and the parts associated with them, particularly the parts of the burner concerned with ignition, shall be placed in well defined and fixed positions.

The user shall be able to see the burner flames either with the door open or shut, depending on the design of the appliance.

2.2.9.3 Griddle plates. A griddle plate supplied with an appliance shall be so designed that it can be placed in an accurate and stable manner on the burner for which it is designed, and that cooking greases do not spill into the burner.

2.2.9.4 Outlets for combustion products. The openings provided inside the oven, to evacuate the products of combustion shall be so designed and placed that the possibility of their being obstructed by food or utensils placed in the oven is avoided.

The outlet for the final discharge of the oven products of combustion shall be so designed that it cannot be obstructed accidentally when the appliance is placed against a wall or when vessels are placed on the hotplate and the possibility of it being obstructed by food or foreign bodies falling into it is avoided. In addition, where an outlet, which is situated above the hotplate level and discharges the combustion products forward of any splashplate, is blocked, the appliance shall still comply with the requirements of 3.3.2 or the gas supply to the oven burner controlled by a flame failure device shall be cut off.

2.2.10 Cylinder compartment (for appliances incorporating a liquefied petroleum gas cylinder). The opening of this compartment shall be of a size which will permit the easy introduction and removal of the cylinder.

The dimensions of the opening and of the inside of the compartment shall be at least large enough to accommodate the cylinders (with regulator fitted) which are the most commonly used in the country in which the appliance is to be sold and are recommended by the manufacturer in his instructions. In all cases, the dimensions of the opening shall not be less than 325 mm in width and 620 mm in height.

In addition the compartment shall be so designed that:

- effective ventilation is provided by openings in its base and upper section, the total area of the opening of the base and that of the openings in the upper section each being at least $\frac{1}{100}$ of the floor area of the compartment;
- the cylinder support has sufficient mechanical strength to resist deformation under the load of a full cylinder; an arrangement with the cylinder resting directly on the ground is unacceptable;
- it has no sill higher than the base on which the cylinder rests;
- the cylinder can be easily inserted in, or removed from, the appliance;
- the cylinder tap is readily accessible and remains easy to manipulate when the cylinder is in place;
- overflow of liquid from pans on the hotplate does not fall onto the cylinder or its accessories;
- where the appliance may be connected by a flexible tube, this shall not be in contact with sharp edges;
- no internal communication exists between the cylinder compartment and the different parts of the appliance where burners are placed (e.g. to a closed compartment or spillage tray);

the ventilation openings of the compartment cannot be obstructed when the appliance is placed in position.

2.2.11 Appliances with a plate-rack. If an appliance has a rack for supporting plates, it shall be secure when loaded with plates in accordance with the manufacturer's instructions and the plates shall be securely held in the rack.

2.2.12 Appliances with enclosed compartments. Appliances with enclosed compartments shall be so designed that:

- the failure of a clock, timing or other similar device, or the failure and restoration of electric supply, shall not affect the normal safety of the appliance;
- if a manual override is employed to enable the appliance to be used when the electricity fails, the appliance shall still operate safely;
- restoration of the power supply shall not result in a hazard.

Compliance with these requirements shall be assessed by an examination of the design of the appliance and its control system(s) to determine whether it allows unignited gas to enter a compartment where, after some delay, it may be ignited by means of any ignition source on the appliance. The following factors shall be taken into account during the examination;

- a) failure and restoration of the power supply;
- b) failure of a clock, timer or other similar device;
- c) operation of manual override;
- d) reasonable misinterpretation of users' instructions;
- e) that compliance with the flame stability requirements is dependent on a re-ignition device;
- f) the possibility of ignition from other ignition sources on the appliance, e.g. via a flue.

If delayed ignition of an accumulation of gas is not possible the appliance is deemed to satisfy the requirements.

If delayed ignition of an accumulation of gas is found to be possible the following test is carried out.

Supply the appliance with the reference gas at normal pressure. Starting from cold and with the ignition device de-activated, allow gas to enter the compartment at the maximum rate under the circumstances found during the examination. Activate the ignition device, or other source of ignition, after a suitable delay. Repeat with progressively increased delays until the worst condition is found.

The requirements are deemed to be satisfied if, upon ignition under the worst conditions:

- there is no damage or distortion of the appliance;
- the compartment door is not blown open;
- no flames are emitted from the front of the appliance.

3 Performance characteristics

3.1 General

3.1.1 Soundness: durability of method of sealing

3.1.1.1 Soundness. Under the test condition specified in 4.3.1.1.1, the leak detected during each of the tests nos. 1 and 2 shall not exceed 0.10 dm³/h. This requirement shall also be satisfied after all the appliance tests have been carried out but before any of the components used in the soundness tests have been removed.

3.1.1.2 Durability of the method of sealing. A sealing product for an appliance for use with L.P.G. and in the test conditions specified in 4.3.1.1.2 shall show no loss of mass exceeding 5 % of the initial mass of the sample, and its permeability shall be nil, both at the time of delivery and after accelerated ageing. Its Shore A hardness shall not have varied by more than 5 units after accelerated ageing.

3.1.2 Obtaining the input rates

3.1.2.1 Obtaining the nominal rate. Under the conditions of test specified in 4.3.1.2.1 each of the burners, supplied separately, shall be capable of giving the nominal heat input stated by the manufacturer. However:

for category I appliances fitted with injectors where the rate is not adjustable, a tolerance of $\pm 5\%$ relative to the nominal rate is permitted for the value obtained in the test; this tolerance is raised to $\pm 10\%$ for category I appliances fitted with injectors having a diameter less than, or equal to, 0.5 mm.

for category II and III appliances the rate with each of the gases indicated in 4.3.1.2.1 shall not deviate by more than $\pm 10\%$ from the nominal value stated by the manufacturer. However this deviation shall not exceed 0.177 kW on gross C.V. or 0.160 kW on net C.V. for burners having nominal rates between 1.77 kW on gross C.V. or 1.60 kW on net C.V. and twice these values. For burners having nominal rates greater than these values, i.e. 3.54 kW on gross C.V. or 3.20 kW on net C.V., the deviation allowed is limited to 5 % of the nominal rate. For appliances of category II_{2L3} supplied with butane at a pressure of 28 or 30 mbar, the tolerance is always $\pm 10\%$.

3.1.2.2 Obtaining the reduced rate. Under the test conditions specified in 4.3.1.2.2 it shall be possible to adjust the principal and auxiliary burners to give the reduced rates shown in Table 3.

Table 3 — Reduced rates

Type of burner		Reduced rates	
		using 1st and 2nd family gases	using 3rd family gases
Auxiliary		$\leq \frac{1}{3}$ nominal rate	$\leq \frac{1}{3}$ nominal rate
	Gross C.V. Net C.V.	≤ 0.29 kW ≤ 0.26 kW	≤ 0.29 kW ≤ 0.26 kW
Semi-rapid		$\leq \frac{1}{6}$ nominal rate	$\leq \frac{1}{5}$ nominal rate
	Gross C.V. Net C.V.	≤ 0.35 kW ≤ 0.31 kW	≤ 0.35 kW ≤ 0.31 kW
Rapid Ultra-rapid		$\leq \frac{1}{6}$ nominal rate	$\leq \frac{1}{5}$ nominal rate

3.1.3 Safety devices. Under the conditions of test described in 4.3.1.3 ignition delay times shall not exceed 10 s where there is continuous manual intervention by the user; if there is no continuous manual intervention, the ignition delay time may be increased to 60 s. The extinction delay time shall not exceed 60 s where the burner is situated inside a compartment, and it shall be less than 90 s if the burner is not enclosed.

3.1.4 Safety of operation. The burners shall show no deterioration likely to jeopardize performance, even after the test in 4.3.1.4.1.

In addition, any ignition pilot flame shall not be extinguished under the test conditions of 4.3.2.1.2, or of 4.3.1.4.2 when it is not possible to carry out the test of 4.3.2.1.2.

When the burners are alight there shall be no escape of unburnt gas detectable by the method specified in 4.3.1.4.3.

If a burner is protected by a flame failure device having a pilot, then, under the conditions of test given in 4.3.1.4.4, the ignition or re-ignition shall remain satisfactory or the supply of gas to the burner shall be shut off in the event of blockage of the port which supplies the ignition flame or of any other part of the ignition device leading to shortening or distortion of the flame.

3.1.5 Heating

3.1.5.1 Temperature of various parts of the appliance. Under the conditions given in 4.3.1.5.1 and 4.3.1.5.2 the surface temperature of the various parts of the appliance indicated below shall not exceed the specified limits.

The temperature of those components that are intended to be touched, measured only in the areas intended to be touched, shall not exceed the ambient by more than:

- 35 °C for metals or equivalent materials;
- 45 °C for porcelain or equivalent materials;
- 60 °C for plastics or equivalent materials.

Under the conditions of test given in test no. 3 in 4.3.1.5.2, the temperature rise of the handle of a shut-down lid, or the area which has to be touched to raise the lid, shall not exceed the temperature rise given above. In addition, the temperature rise of the upper surface of the lid, excluding the area to the rear of a line parallel to the front of the cooker and 12 mm forward of any flue outlet in the lid, shall not exceed 100 °C.

The temperature of the sides of the appliance shall not exceed the ambient by more than 100 °K.

If the end of the gas inlet can be fitted with a push-on connector conforming to the national situations given in Table 13 of 5.2, this connector shall be positioned so that its temperature does not exceed the ambient temperature by more than 30 °C.

If a cooker can be connected by means of a flexible tube and if the method of installation given in the manufacturer's instructions allows the flexible tube to pass behind the cooker, providing that this arrangement is allowed by the installation regulations in force in the country where the appliance is to be used, the rise in temperature of any part of the cooker likely to come into contact with the flexible tube shall be declared by the manufacturer in his instructions for installation and adjustment.

For an appliance that is designed to be connected by means of a flexible tube that is not completely metallic, the rise in temperature of any part of the appliance likely to come in contact with the tube shall not exceed 70 °C.

When measured under the conditions given in 4.3.1.5.3, the temperature of those parts of the front of the appliance which can be touched accidentally shall not exceed the ambient by more than:

- 60 K for metal and painted metal;
- 65 K for enamelled metal;
- 80 K for glass and ceramic;
- 100 K for plastics.

However, these requirements shall not apply to the following parts of the front:

- a) those which are not accessible to a test probe 75 mm in diameter having a hemispherical end; or
- b) those which, on appliances having a hotplate (hob), are less than 25 mm below the level of the hotplate (hob), excluding the pan supports, or which are above the hotplate (hob); or
- c) those which are of small dimension, such as vents for ventilation or for evacuation of products of combustion, hinges and trims of which the width of the accessible surface is less than 10 mm; or
- d) those which are less than 10 mm from outlet vents intended for the evacuation of products of combustion.

NOTE No consideration need be given to a measurement if it relates to an area of less than 1 cm².

3.1.5.2 Temperature of the support, walls or adjacent surfaces. The temperature of the support on which the appliance is placed as well as the temperature of the walls situated near the appliance and, when applicable, the ceilings, shelves or cupboards above cookers with high-level grills shall not, under the test conditions defined in 4.3.1.5.1 and 4.3.1.5.2, exceed the ambient by more than 80 °C for the support, the adjacent side wall and the ceiling and 100 °C for the back wall.

For independent hotplates and table cookers the temperature rise of the support may reach 100 °C.

When the increase in temperature of the walls or of the support is greater than 50 °C, the manufacturer shall indicate in his instructions for installation and adjustment what kind of effective protection shall be provided between the apparatus and the walls if the latter are not made of non-flammable materials. Such protection shall be provided to the test laboratory which verifies that, when the appliance is fitted with this protection, the temperature of the walls, measured under the test conditions specified in 4.3.1.5.1 and 4.3.1.5.2, does not exceed the ambient temperature by more than 50 °C.

3.1.5.3 Temperature of taps. Under the conditions defined in 4.3.1.5.1 and 4.3.1.5.2, the temperature of tap bodies shall not exceed the value recommended by the manufacturer and in any case it shall not exceed 145 °C for an ambient temperature of 20 °C.

3.1.6 Overheating of the L.P.G. cylinder and its compartment

3.1.6.1 Overheating of the walls of the compartment. Under the conditions defined in 4.3.1.6, the temperature rise above ambient of the compartment walls shall not exceed 30 °C at any point that is likely to come in contact with the flexible tube.

3.1.6.2 Overheating of the L.P.G. cylinder. The compartment shall be such that, under the test conditions defined in 4.3.1.6, when the cylinder is in the compartment, there is no overheating that will produce an increase of vapour pressure greater than that defined in Table 4:

- a) after 1 h with the hotplate and oven alight;
- b) during the 30 min following complete extinction.

Table 4 — Maximum pressure increase inside the L.P.G. cylinder

Ambient temperature °C	Maximum acceptable ⁽¹⁾ increase of pressure bar
10	0.35
15	0.40
20	0.45
25	0.50
30	0.55
35	0.60
40	0.65
NOTE (1) This increase corresponds to a temperature rise of 5 °C starting from the appropriate ambient temperature.	

3.1.7 Total input to the appliance. Under the test conditions defined in 4.3.1.7 the total input of the appliance, all the taps being in the fully open position, shall not be more than 10 % below the sum of the individual inputs of the different burners supplied separately under the same conditions.

3.1.8 Governor performance. An appliance fitted with a gas governor is checked to ensure that, under the conditions laid down in 4.3.1.8, the gas rate does not change by more than 7.5 % of the rate obtained at the normal test pressure.

3.2 Hotplates

3.2.1 Safety of operation. Under the test conditions defined in 4.3.2.1 and in a still atmosphere, lighting and cross-lighting shall be ensured correctly and without excessive noise. The flames shall be stable and silent. A slight tendency to flame lift is permitted at the moment of ignition, but the flames shall be stable under full working conditions.

Cross-lighting of the various parts of the burners shall be ensured when the burner has been adjusted to its nominal rate and the supply pressure varies from the minimum to the maximum value.

In addition, no hotplate burner or pilot shall be extinguished under the test conditions defined in 4.3.2.1.2 and 4.3.2.1.3; however, the latter test shall not be carried out where burners are fitted with flame failure devices.

Moreover, under the test conditions specified in 4.3.2.1.4, the burners shall light easily and the flames shall be stable.

3.2.2 Combustion. For each of the hotplate burners working separately (tests 1, 2 and 3) or simultaneously (test 4) the quantity of CO in the air and water free products of combustion shall not exceed the values indicated in Table 5.

Table 5 — Quantity of CO in the combustion products

Test No.	Burners in operation	Gas used	Position of taps	% CO max.
1	each burner individually	each reference gas	full on	0.10
2	each burner individually	each reference gas	corresponding to $\frac{1}{2}$ nominal rate	0.10
3	each burner individually	limit gas for incomplete combustion	full on	0.20
4	all hotplate burners and (if possible) oven and grill simultaneously	each reference gas	full on	0.20

The conditions for carrying out these tests are given in **4.3.2.2**.

3.2.3 Efficiency. The requirements given in **3.2.3.1** and **3.2.3.2** are applicable only to burners with nominal heat inputs greater than:

gross C.V. : 1.16 kW

net C.V. : 1.05 kW

3.2.3.1 Uncovered burners. The efficiency determined under the test conditions specified in **4.3.2.3.1** shall be at least:

52 % : gross C.V.

58 % : net C.V.

3.2.3.2 Covered burners. The efficiency determined under the test conditions specified in **4.3.2.3.2** shall be at least:

25 % (from cold) : gross C.V.

35 % (from hot) : gross C.V.

28 % (from cold) : net C.V.

39 % (from hot) : net C.V.

3.3 Ovens and grills

3.3.1 Safety of operation. Under the various test conditions defined in **4.3.3.1**, satisfactory cross-lighting and flame stability shall be ensured.

Oven and grill burners shall, with the oven both cold and hot, light completely and smoothly, in accordance with the instructions for use, which in particular shall specify that the oven shall always be lit at full rate, the thermostat control, if any, being adjusted to the maximum mark.

If a grill is situated in such a way that it may be affected by the functioning of the hotplate and/or oven burners, lighting shall be satisfactory and no excessive flame instability shall be evident when tested in accordance with **4.3.3.1**. In particular, the flame shall on no account extend outside the roof of the grill, but a certain amount of flame movement and elongation is acceptable. If there is any doubt whatsoever regarding the stability of the flame, the quality of combustion shall be verified as described in **4.3.3.1**.

3.3.2 Combustion. When the appliance is supplied with reference gas under the conditions defined in **4.1.3** and **4.3.3.2**, the quantity of CO in air and water-vapour-free products of combustion shall not exceed 0.10 %, 15 min after ignition.

For the test with the grill at reduced rate, where applicable, the quantity of CO, under the conditions specified in **4.3.3.2**, shall not exceed 0.10 % after 15 min initially operating at the nominal rate. In addition, 5 min after ignition, the quantity of CO shall not exceed 0.20 %.

When the appliance is supplied under the same conditions with the incomplete combustion limit gas defined in **4.1.1**, the quantity of CO shall not exceed 0.20 % 15 min after ignition.

3.3.3 Oven temperature. The time required to reach, at the centre of the empty oven, a temperature rise equal to 85 % of the maximum temperature rise, shall not exceed 20 min under the conditions specified in **4.3.3.3**.

In steady conditions, and at an ambient temperature of 20 °C, the centre oven temperature shall not exceed 160 °C when the burner is operating at the reduced rate.

If there is a thermostat, the equilibrium temperatures for the various positions of the control handle shall be evenly distributed between the minimum value, which shall not exceed 160 °C, and the maximum value. When the various positions of the handle are marked in °C, the centre oven temperatures measured under the conditions given above shall not vary, for each position, by more than ± 10 °C from the value corresponding to the marking.

In addition, for each position of the thermostat handle the fluctuations of the temperature about the equilibrium value shall not exceed ± 5 % of the average value.